

Hornsea Project Three  
Offshore Wind Farm



## Hornsea Project Three Offshore Wind Farm

Preliminary Environmental Information Report:  
Chapter 3 – Ecology and Nature Conservation (Part 2)

Date: July 2017

Environmental Impact Assessment  
Preliminary Environmental Information Report

Volume 3  
Chapter 3: Ecology and Nature Conservation

Report Number: P6.3.3  
Version: Final  
Date: July 2017

This report is also downloadable from the Hornsea Project Three offshore wind farm website at:  
[www.dongenergy.co.uk/hornseaproject3](http://www.dongenergy.co.uk/hornseaproject3)

DONG Energy Power (UK) Ltd.  
5 Howick Place,  
London, SW1P 1WG

© DONG Energy Power (UK) Ltd, 2017. All rights reserved

Front cover picture: Kite surfer near one of DONG Energy's UK offshore wind farms © DONG Energy Hornsea Project Three (UK) Ltd., 2016.

Liability

This report has been prepared by RPS, with all reasonable skill, care and diligence within the terms of their contracts with DONG Energy Power (UK) Ltd.

## 3.11 Assessment of significance

### 3.11.1 Construction Phase

3.11.1.1 The impacts of the onshore construction of Hornsea Three have been assessed on ecology and nature conservation. The potential environmental impacts arising from the construction of Hornsea Three are listed in Table 3.10 above along with the maximum adverse scenario against which each construction phase impact has been assessed.

3.11.1.2 A description of the potential effect on ecology and nature conservation receptors caused by each identified impact is given below.

#### Potential for construction of landfall cable to adversely impact Weybourne Cliffs SSSI

3.11.1.3 Two landfall locations and cable routes are identified at the north end of the scheme. The eastern landfall option passes through Weybourne Cliffs SSSI. Approximately 1.8 ha of land within the SSSI falls within the Ecology and nature conservation study area. This is 4.41% of the total SSSI area.

3.11.1.4 Weybourne Cliffs SSSI is designated for geological features. Although breeding Sand Martin colonies are also noted as being present on the SSSI citation, current information suggests that no Sand Martin colonies are present in the section of cliff potentially affected by construction. The impact on Weybourne Cliffs SSSI is therefore on the geological features only, and therefore the assessment of effects is reported in Volume 3 Chapter 1: Geology and Ground Conditions.

#### Potential for open cut trenching and installation of cables to cause habitat loss within designated sites.

3.11.1.5 Nineteen designated sites fall within the onshore cable corridor search area. Of these, Booton Common SSSI is a component part of Norfolk Valley Fens SAC and the areas affected are therefore identical. Impacts within The River Wensum SAC and SSSI are also identical in terms of areas affected. Only one site (Beach Lane, Weybourne CWS) is entirely within the onshore cable corridor search area.

3.11.1.6 At the PEIR stage the initial assessment of impacts has assumed that any and all habitats within the onshore cable corridor search area would be lost for installation of the cables via open cut, as a worst-case scenario.

3.11.1.7 Table 3.15 provides a brief summary of the habitats present in the sections of the sites that fall within the onshore cable corridor search area.

3.11.1.8 The impacts of habitat loss are considered in isolation from any additional impacts that might arise beyond the site boundary. Those impacts are considered in a separate section.

#### Magnitude of impact

3.11.1.9 The magnitude of impacts assuming the maximum design scenario of open cut trenching for cable installation across designated sites is summarised in Table 3.15 and paragraphs 3.11.1.12 - 3.11.1.27.

3.11.1.10 It is possible in the majority of cases to avoid impacts within designated sites by ensuring that the final 80m trenching route avoids designated sites that fall within the onshore cable corridor search area. In such situations the impacts would be avoidable entirely. In some cases, where sites cross the whole of the onshore cable corridor search area, or a significant section of it, it would not be possible to avoid trenching within designated sites. In these situations, and where impacts would otherwise be significant in EIA terms, trenchless techniques could be employed to avoid impacts.

3.11.1.11 Given that impact avoidance via cable route selection and/or trenchless techniques is the most effective way of avoiding or reducing impacts, this section also provides an assessment of impact magnitude which indicates how impacts would reduce if these options are committed to at Final Environmental Statement stage (Table 3.16).

3.11.1.12 Norfolk Valley Fens SAC/Booton Common SSSI: The area of habitat within the onshore cable corridor search area is 0.1 ha. This is 0.01% of the total Norfolk Valley Fens site area and 1.12% of the Booton Common area. The habitats present are broad-leaved and wet woodland. The impact is predicted to be of local spatial extent, medium term duration and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor** for the SAC and **moderate** for the SSSI.

3.11.1.13 River Wensum SAC/SSSI: The SAC/SSSI boundary encompasses the river channel and a thin strip of riparian habitat 0.3 ha in size. This is 0.09% of the total SAC/SSSI. The impact is predicted to be of local spatial extent, medium term duration and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

3.11.1.14 Weybourne Cliffs SSSI. The worst case scenario of open trenching across the cliffs and clifftops would represent a loss of 1.8 ha or 4.41% of the total site area. This impact is assessed in Volume 3, Chapter 1: Geology and ground conditions,.

3.11.1.15 Kelling Heath SSSI: 5.2 ha of heathland habitat within the SSSI falls inside the onshore cable corridor search area, which is 5.2% of the SSSI. Although restoration would be put in place, restoration of heathland is not guaranteed and can take many years to succeed. In addition the maximum design scenario would involve three separate trenching operations over an 11 year period, and it is considered unlikely that heathland restoration would succeed except potentially in the very long term given the repeat disturbance that would result in this scenario. The impact is predicted to be of local spatial extent, long term duration, and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.

- 3.11.1.16 Alderford Common SSSI: Approximately 0.4 ha of broad-leaved semi-natural woodland and ponds, 2.52% of the SSSI, falls within the SSSI boundary. The woodland is secondary woodland and therefore there is potential for restoration of this habitat type in the long term (albeit with shallow-rooting trees only), and the loss of ponds would affect a number of species included on the citation. The impact is predicted to be of local spatial extent, long term duration, and of low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.17 Beach Lane, Weybourne CWS: This site comprises reedbed and stream-fed pools and is wholly within the onshore cable corridor search area. The maximum design scenario would therefore comprise the complete loss of this site, and the effects of cable trenching through it could affect the hydrology such that the success of restoration would be uncertain. The impact is predicted to be of local spatial extent, long term duration, and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.18 Kelling Heath Park & 100 Acre Wood CWS: 4.6 ha of heathland/grassland mosaic, scrub and secondary woodland lies within the onshore cable corridor search area, comprising just over 7% of the total CWS area. Although restoration would be put in place, restoration of heathland is not guaranteed and can take many years to succeed. The impact is predicted to be of local spatial extent, long term duration, and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.19 Dismantled Railway CSW: 0.4 ha of habitat, 6.31% of the CWS, is within the onshore cable corridor search area. Habitats present are a soil track with tall ruderal, scrub and mature trees on either side. The habitats are capable of restoration but the cable installation will sever this linear site. The impact is predicted to be of local spatial extent, medium term duration, and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.
- 3.11.1.20 Marriott's Way CWS: The cable installation crosses the CWS in two places. The total area within the onshore cable corridor search area is 0.8 ha, 1.27% of the total site area. Habitats present are tall ruderal and mature trees and therefore restoration is feasible. The impact is predicted to be of local spatial extent, medium term duration, and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.
- 3.11.1.21 Bush Meadow Plantation CWS: 0.6 ha of broad-leaved semi-natural woodland is within the onshore cable corridor search area. This comprises 13.26% of the total site boundary. The impact is predicted to be of local spatial extent, long term duration, and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.22 Harman's Grove CWS: 1.5 ha of replanted ancient semi-natural broad-leaved woodland managed as coppice with standards, 32% of the total site area, falls within the onshore cable corridor search area. This comprises a significant proportion of the site, and given that deep-rooting trees cannot be planted over the cables, habitat restoration is not considered to be a realistic possibility. Cable installation would also result in the loss of soil biota associated with ancient woodland, affecting the integrity of the site. The impact is predicted to be of local spatial extent, long term duration, and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.23 Land adjoining River Tud CWS: 2.3 ha of the CWS, 33% of the total site area, is within the onshore cable corridor search area. Habitats comprise pasture, wet meadow and ditches, and the cable route would fragment the site and therefore could affect integrity given the potential effects on hydrology. The impact is predicted to be of local spatial extent, long term duration, and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.24 Old Hall Meadow CWS: 1.3 ha of semi-improved grassland containing ponds is within the onshore cable corridor search area, comprising 76.73% of the CWS. The loss of a large proportion of the site could affect integrity although restoration should be feasible. The impact is predicted to be of local spatial extent, medium term duration, and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.25 Yare Valley (Marlingford) CWS: A very small amount of broad-leaved semi-natural habitat, around 0.03 ha, is within the onshore cable corridor search area. This is less than 1% of the total CWS area and is therefore highly unlikely to adversely affect the integrity of the site. The impact is predicted to be of local spatial extent, long term duration, and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.
- 3.11.1.26 Low Common CWS: 1.2 ha of grassland, fen and woodland habitat falls within the onshore cable corridor search area, comprising 20.33% of the site. The onshore export cable corridor would sever the site and could therefore affect integrity. The impact is predicted to be of local spatial extent, medium term duration, and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- 3.11.1.27 Foxburrow Meadow CWS: 0.6 ha of marshy grassland, 17.45% of the total site area, falls within the Ecology and nature conservation study area. The impact is predicted to be of local spatial extent, medium term duration, and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **major**.
- Sensitivity of receptor
- 3.11.1.28 Norfolk Valley Fens SAC/Booton Common SSSI: The site is a component part of an internationally designated site, and is potentially highly vulnerable to impacts from habitat loss. The hydrology of the site could be affected by trenching. The site is deemed to be of high vulnerability, low recoverability and very high value. The sensitivity of the receptor is therefore, considered to be **very high**.

- 3.11.1.29 River Wensum SAC/SSSI: The riparian habitats in the location of the onshore export cable route are not considered to be of themselves particularly vulnerable, and recoverability is high. The site as a whole is of international importance. The site is deemed to be of low vulnerability, high recoverability and very high value. The sensitivity of the receptor is therefore, considered to be **high**.
- 3.11.1.30 Kelling Heath SSSI: Restoration of heathland following loss or disturbance is difficult and can take many years to be successful, if successful at all. The site is deemed to be of high vulnerability, low recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.
- 3.11.1.31 Alderford Common SSSI: Woodland could be replanted but damage to soils would result in secondary woodland being of less value. The site is deemed to be of high vulnerability, medium recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.
- 3.11.1.32 Beach Lane, Weybourne CWS: The loss of reedbed from trenching is in principle reversible provided that the hydrology of the site is maintained. The site is deemed to be of medium vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.33 Kelling Heath Park & 100 Acre Wood CWS: Restoration of heathland following loss or disturbance is difficult and can take many years to be successful, if successful at all. The site is deemed to be of high vulnerability, low recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.34 Dismantled Railway CSW: The habitats on this designated site in the affected area are not particularly of high value and are common in the County. The site is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.
- 3.11.1.35 Marriott's Way CWS: The habitats on this designated site in the affected area are not particularly of high value and are common in the County. The site is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.
- 3.11.1.36 Bush Meadow Plantation CWS: The site comprises broad-leaved secondary woodland and therefore restoration is in principle possible. The site is deemed to be of low vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.37 Harman's Grove CWS: This site comprises replanted ancient woodland. Ancient woodland is not recoverable once the woodland soils and associated flora and fauna have been significantly disturbed which is inevitable from trenching excavations. The site receptor is deemed to be of high vulnerability, low recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.38 Land adjoining River Tud CWS: There is potential for the hydrology of the site to be affected by trenching which could affect the ability of the habitats to recover post-restoration. The site is deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.39 Old Hall Meadow CWS: The site comprises grassland and ponds that are capable of restoration following trenching. The site is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- 3.11.1.40 Yare Valley (Marlingford) CWS: A very small section of the site is affected. The site is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.
- 3.11.1.41 Low Common CWS: The cable corridor would bisect this site and there is therefore the potential for hydrological impacts to affect recoverability. The site is deemed to be of high vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **high**.
- 3.11.1.42 Foxburrow Meadow: The site contains marshy grassland and fen and therefore hydrological impacts could affect restoration. The site is deemed to be of medium vulnerability, medium recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.
- Significance of the effects
- 3.11.1.43 Table 3.15 summarises effect significance on designated sites under the maximum design scenario assumption of open trench cable installation within designated sites that fall within the Ecology and nature conservation study area . These effects are summarised in paragraphs 3.11.1.46 - 3.11.1.60, and represent the maximum adverse scenario in terms of habitat loss impacts.
- 3.11.1.44 As noted previously, it is possible in many of cases to avoid impacts within designated sites by ensuring that the final 80m cable corridor in the construction phase avoids designated sites that fall within the Ecology and nature conservation study area , or by employing trenchless techniques.
- 3.11.1.45 Given that impact avoidance via cable route selection and / or trenchless techniques is the most effective way of avoiding or reducing impacts, an assessment of effect significance setting out how significance would reduce if these options can be committed to at Final Environmental Statement stage has also been provided Table 3.16.
- 3.11.1.46 Norfolk Valley Fens SAC/Booton Common SSSI: There is only a small amount of habitat loss predicted within the site boundary. However, the habitats present are particularly sensitive to hydrological change, and the trenching could therefore affect the ability of the habitats to recover. Overall, it is predicted that the sensitivity of the receptor is considered to be **very high** (for the SAC) and **high** (for the SSSI) and the magnitude is deemed to be **minor**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.
- 3.11.1.47 River Wensum SAC/SSSI: The riparian habitats present could be restored with in the medium-long term but would still result in temporary loss of habitat within an internationally designated site albeit on a small scale relative to the size of the site. Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

- 3.11.1.48 Kelling Heath SSSI: Given the difficulty of successfully restoring heathland, damage to heathland habitat within the SSSI is likely to significantly affect the site and associated fauna. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **major**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.
- 3.11.1.49 Alderford Common SSSI: Loss of woodland within a SSSI is significant given the disturbance to soils that would occur, meaning that replanted woodland would be unlikely to return to a similar condition for many years, and the inability to plant deep-rooted trees over the cables. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **major**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.
- 3.11.1.50 Beach Lane, Weybourne CWS: Potentially all of this site is within the onshore cable corridor search area and would be lost. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.
- 3.11.1.51 Kelling Heath Park & 100 Acre Wood CWS: Given the difficulty of successfully restoring heathland, damage to heathland habitat within the CWS is likely to significantly affect the site and associated fauna. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.
- 3.11.1.52 Dismantled Railway CSW: Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.
- 3.11.1.53 Marriott's Way CWS: Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.
- 3.11.1.54 Bush Meadow Plantation CWS: The loss of secondary woodland over an area covering 13% of the site would result in a significant reduction in the extent of the habitat within the site boundary. Restoration via replacement planting should be successful in the medium-long term. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.
- 3.11.1.55 Harman's Grove CWS: Loss of woodland is significant given the disturbance to soils that would occur, meaning that replanted woodland would not return to pre-disturbance conditions. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.
- 3.11.1.56 Land adjoining River Tud CWS: In principle, restoration of wet meadow and ditches is possible provided that the hydrological regime of the site can be restored, but a significant percentage of the site would be affected. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.
- 3.11.1.57 Old Hall Meadow CWS: Over 75% of the site would be affected and therefore while restoration is feasible there would be a significant effect on the site in the medium term. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.
- 3.11.1.58 Yare Valley (Marlingford) CWS: A very small area of this site would be affected and restoration is not expected to present significant challenges. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.
- 3.11.1.59 Low Common CWS: The cable corridor will bisect the site and result in the loss of 20% of habitat. In principle, restoration of grassland and fen is possible provided that the hydrological regime of the site can be restored, but a significant percentage of the site would be affected. Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is not significant in EIA terms.
- 3.11.1.60 Foxburrow Meadow CWS: The cable installation will result in the loss of 17% of habitat. In principle, restoration of marshy grassland and fen is possible provided that the hydrological regime of the site can be restored, but a significant percentage of the site would be affected. Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **major**. The effect will, therefore, be of **moderate adverse** significance, which is not significant in EIA terms.
- 3.11.1.61 Measures to reduce impacts from habitat loss on designated sites where impacts are predicted to be significant in EIA terms (moderate or above) under the maximum design scenario of open trenching within designated sites is provided in Table 3.14. It is in principle possible to avoid direct habitat loss in all designated sites where impacts considered significant in EIA terms would occur, through either:
- Selection of final 80 m cable route within the onshore cable corridor search area so that all installation occurs outside the designated site boundaries; or

- HDD under designated sites. This will be required for river corridor crossings (e.g. the Wensum and the Tud) or sites that cross the entirety of the onshore cable corridor search area where it is not possible to route the onshore export corridor outside the site boundary.

3.11.1.62 Opportunities to avoid direct habitat loss in designated sites (including those identified above) would be considered during the refinement of the onshore cable route and would be reported in the Environment Statement.

Table 3.15: Summary of maximum design scenario habitat loss impacts on designated sites assuming open cut cable installation within the Ecology and nature conservation study area .

Site Name	Area (ha)	Area in PEIR	% in PEIR	Description of habitats affected	Magnitude	Sensitivity	Significance
Norfolk Valley Fens SAC	616.5	0.1	0.01	Broad-leaved semi-natural and wet woodland.	Minor	Very High	Moderate
River Wensum SAC	306.8	0.3	0.09	River corridor	Minor	High	Moderate
Kelling Heath SSSI	89.5	5.2	5.76	Dry heathland and scrub	Major	High	Major
Booton Common SSSI	8.2	0.1	1.12	Broad-leaved semi-natural and wet woodland.	Moderate	High	Moderate
Alderford Common SSSI	17.5	0.4	2.52	Broad-leaved semi-natural woodland and ponds	Major	High	Major
River Wensum SSSI	309.4	0.3	0.09	River corridor	Minor	High	Minor
Beach Lane, Weybourne CWS	1.9	1.9	100.00	Shallow pool dominated by reedbed	Major	Medium	Major
Kelling Heath Park & 100 Acre Wood CWS	65.6	4.6	7.05	Dry heathland and scrub	Major	Medium	Moderate

Site Name	Area (ha)	Area in PEIR	% in PEIR	Description of habitats affected	Magnitude	Sensitivity	Significance
Dismantled Railway CWS	5.7	0.4	6.31	Bare soil track with marginal tall ruderal and scrub vegetation and a line of mature broad-leaved trees on both sides.	Moderate	Low	Minor
Marriott's Way CWS	64.6	0.8	1.27	Cable corridor crosses CWS in two places. Soil track, tall ruderal and mature trees.	Minor	Low	Minor
Bush Meadow Plantation CWS	4.8	0.6	13.26	Broad-leaved semi-natural woodland.	Major	Medium	Moderate
Harman's Grove CWS	4.7	1.5	32.38	Replanted ancient semi-natural broad-leaved woodland managed as coppice with standards	Major	Medium	Moderate
land adjoining River Tud CWS	7.1	2.3	33.07	Rough pasture, wet meadow and ditches	Major	Medium	Moderate
Old Hall Meadow CWS	1.6	1.3	76.73	Semi-improved grassland with ponds and small blocks of scrub and trees.	Major	Medium	Major
Yare Valley (Marlingford) CWS	36.5	0.0	0.07	Broad-leaved semi-natural woodland	Minor	Low	Minor
Low Common CWS	5.8	1.2	20.33	Mosaic of grassland, fen and woodland with wet ditches.	Major	High	Moderate

Site Name	Area (ha)	Area in PEIR	% in PEIR	Description of habitats affected	Magnitude	Sensitivity	Significance
Foxburrow Meadow CWS	3.4	0.6	17.45	Marshy grassland, patches of tall herb fen, scrub and scattered trees.	Major	Medium	Moderate

Table 3.16: Summary of habitat loss impacts on designated sites if impacts are minimised / avoided through final route selection and / or trenchless techniques.

Site Name	Potential method of reducing impact magnitude	Magnitude	Sensitivity	Significance
Norfolk Valley Fens SAC	Avoidance of direct impacts on habitats via HDD	No change	Very High	Negligible
River Wensum SAC	Avoidance of direct impacts on habitats via HDD	No change	High	Negligible
Kelling Heath SSSI	Selection of cable route outside site boundary	No change	High	Negligible
Bopton Common SSSI	Broad-leaved semi-natural and wet woodland.	No change	High	Negligible
Alderford Common SSSI	Selection of cable route outside site boundary	No change	High	Negligible
Beach Lane, Weybourne CWS	Selection of cable route outside site boundary	No change	Medium	Negligible
Kelling Heath Park & 100 Acre Wood CWS	HDD under sensitive habitats (heathland and woodland)	No change	Medium	Negligible
Bush Meadow Plantation CWS	Selection of cable route outside site boundary	No change	Medium	Negligible
Harman's Grove CWS	Selection of cable route outside site boundary	No change	Medium	Negligible
Land adjoining River Tud CWS	Avoidance of direct impacts on habitats via HDD	No change	Medium	Negligible

Site Name	Potential method of reducing impact magnitude	Magnitude	Sensitivity	Significance
Old Hall Meadow CWS	HDD under sensitive habitats (grassland and ponds)	No change	Medium	Negligible
Low Common CWS	HDD under sensitive habitats (grassland and fen)	No change	Medium	Negligible
Foxburrow Meadow CWS	Selection of cable route outside site boundary	No change	Medium	Negligible

#### Further mitigation

- 3.11.1.63 Under the maximum design scenario of open cut trenching through designated sites with a maximum of three phases of installation in an 11 year period, it may not be feasible to commence site restoration until the third cabling phases is complete. Depending on the calendar month that construction started, there would therefore, be a gap of 8.5 – 9 years from start of first construction before permanent restoration can commence (for those habitats where restoration is possible), and, depending on the habitats affected, a further period of 3-10 years before habitats have matured, and hence impacts will be medium to long term.
- 3.11.1.64 This is a precautionary assumption and it should be noted that it may not be necessary to install all phases of cabling in the same location, i.e. where feasible, the full width of the PEIR corridor could be utilised such that a given designated site is only affected by one phase and the other phases are installed outside of the designated site. In such circumstances, restoration could commence directly after the cable installation.
- 3.11.1.65 Even in this scenario, significant impacts would remain for sites containing habitats such as heathland (which is very hard to restore in even the long term) and woodland (where deep rooted trees cannot be replanted over the cable corridor).
- 3.11.1.66 Where feasible, the most effective methods of mitigation are through impact avoidance through corridor selection and/or trenchless techniques as outlined in Table 3.16.

#### Potential for open cut trenching and installation of cables to cause loss of hedgerow habitat.

- 3.11.1.67 Approximately 60 km of hedgerows occurs within onshore cable corridor search area, comprising approximately 26 km of species-poor hedgerow and 34 km of species-rich hedgerow. Surveys to determine how many of these hedgerows qualify as 'Important' under the 1997 Hedgerow Regulations are ongoing.

3.11.1.68 The final layout of the onshore export route corridor will be selected to minimise hedgerow loss wherever possible, and a reduced maximum width of the cable corridor of up to 80 m will be used wherever practicable. The total length of hedgerow to be removed is therefore yet to be determined, but a significant length of hedgerow will need to be removed to facilitate the installation of cables.

3.11.1.69 Given the maximum design scenario of a three phase cable installation spread over an 11 year period, there could be a nine year period between clearance for the first phase and the completion of the third phase before replanting of hedgerows could be carried out. It could therefore take approximately 14-19 years from the time of clearance for replacement hedgerow planting to mature and reconnect severed lengths of hedgerow.

Magnitude of impact

3.11.1.70 The impact is predicted to be of county spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

3.11.1.71 Hedgerows are deemed to be of moderate vulnerability, moderate recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.1.72 Overall, it is predicted that the sensitivity of hedgerows is considered to be **medium** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

3.11.1.73 The outline Landscape Scheme and Management Plan (LSMP) and EMP will set out overarching principles and the approach to the assessment of hedgerows prior to construction, and measures to minimise hedgerow loss. Where hedgerow removal cannot be avoided, the LSMP and EMP will set out measures for their removal and reinstatement.

*Further mitigation*

3.11.1.74 Under the maximum design scenario of an 11 year three phase cable installation, no further mitigation for hedgerows is feasible beyond the designed-in measures of minimising hedgerow loss, and replanting of cleared hedgerows with an appropriate mix of native species.

3.11.1.75 Once the replacement planting has matured, the impact on the hedgerow habitat will be negligible as no significant net loss of hedgerow habitat will occur, but as noted above this would take 14-19 years before replanted hedgerows mature.

**Potential for open cut trenching and installation of cables to cause loss, damage to and disturbance of watercourses.**

3.11.1.76 A number of minor watercourses and drainage ditches will be crossed by open cut trenching along the onshore export cable route.

3.11.1.77 The onshore export cable route has been designed to minimise and avoid, where possible, impacts on existing drainage networks and features.

3.11.1.78 Watercourses that are to be crossed by trenching will require pre-construction surveys of the watercourses prior to the commencement of works in order to inform any mitigation strategy required, as described under species-specific impacts.

3.11.1.79 Works will be carried out in accordance with relevant legislative requirements and best practice guidelines, and a CoCP will be produced to set out how the works will proceed. Measures will be set in place to minimise the potential for pollution from silt deposition into watercourses and from works vehicles, including measures to prevent transfer of invasive plant or animal species between watercourses. The latter is particularly important to avoid risk to watercourses containing White-clawed Crayfish in the headwaters of the River Glaven.

3.11.1.80 Watercourses will either be reinstated following the each phase of the installation of the cable or diverted to a secondary channel in agreement with the appropriate stakeholders and where this will not result in an impact on protected species.

Magnitude of impact

3.11.1.81 The impact is predicted to be of local spatial extent, medium term duration, intermittent and moderate reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor** negative.

Sensitivity of receptor

3.11.1.82 Watercourses are deemed to be of up to high vulnerability, moderate recoverability and up to county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.1.83 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause loss, damage to and disturbance of ponds.**

- 3.11.1.84 A number of ponds occur along the onshore export cable route.
- 3.11.1.85 The onshore export cable route has been designed to minimise direct impacts on ponds wherever possible. The number of ponds directly affected by the final cable route will be determined at the Final Environmental Statement stage.
- 3.11.1.86 Any ponds affected by trenching will require pre-construction surveys prior to the commencement of works in order to inform any mitigation strategy required, as described under species-specific impacts.
- 3.11.1.87 Works will be carried out in accordance with relevant legislative requirements and best practice guidelines, and a CoCP will be produced to set out how the works will proceed. Measures will be set in place to minimise the potential for pollution from silt deposition into ponds and from works vehicles, including measures to prevent transfer of invasive plant or animal species between ponds.

Magnitude of impact

- 3.11.1.88 The impact is predicted to be of local spatial extent, medium term duration, intermittent and moderate reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

- 3.11.1.89 Ponds are deemed to be of high vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

- 3.11.1.90 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause damage to designated sites from airborne pollutants.**

- 3.11.1.91 Open cut trenching and cable installation or duct installation and cable pulling could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation.
- 3.11.1.92 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats within designated sites.

- 3.11.1.93 Designated sites within or close to the cable corridor are listed in Table 3.6. The value of these habitats ranges from county level up to international level for the River Wensum SAC and Norfolk Valley Fens SAC.

Magnitude of impact

- 3.11.1.94 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

- 3.11.1.95 Designated sites are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is therefore, considered to be **very high**.

Significance of the effects

- 3.11.1.96 Overall, it is predicted that the sensitivity of the receptor is considered to be **very high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause damage to habitats from airborne pollutants.**

- 3.11.1.97 Open cut trenching and cable installation or duct installation and cable pulling could have some impact on sensitive habitats in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation. The main potentially sensitive habitats include broad-leaved semi-natural woodland, hedgerows, heathland, semi-improved and marshy grassland, ponds and watercourses.
- 3.11.1.98 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.
- 3.11.1.99 These will include establishment of a buffer zone between the works area and adjacent habitats.

Magnitude of impact

- 3.11.1.100 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

- 3.11.1.101 Habitats are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.102 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause damage to designated sites from run-off pollutants.**

3.11.1.103 Open cut trenching and cable installation or duct installation and cable pulling could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential run-off pollutants, particularly silt or other pollutant deposition into ditches and other watercourses that could potentially cause downstream impacts over a wide area.

3.11.1.104 Designated sites considered to be at particular risk of waterborne pollution are:

- Holt Lowes SSSI/Norfolk Valley Fens SAC (River Glaven);
- Booton Common SSSI/Norfolk Valley Fens SAC;
- River Wensum SSSI/SAC;
- Land adjoining River Tud CWS (River Tud); and
- Yare Valley (Bawburgh) and Pasture at Eaton College CWS (River Yare).

3.11.1.105 HDD will be employed on significant watercourses, which include the Wensum, Tud and Yare, and will avoid the greatest risk to watercourses from run-off pollution, but there still remains some potential for run-off from trenches to reach watercourses within designated sites.

3.11.1.106 The cable corridor crosses a number of small ditches and tributary streams at the headwaters of the River Glaven, upstream of Holt Lowes SSSI/Norfolk Valley Fens SAC.

3.11.1.107 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching watercourses and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats within designated sites.

Magnitude of impact

3.11.1.108 The impact is predicted to be of local spatial extent, medium term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.109 Designated sites are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is therefore, considered to be **very high**.

Significance of the effects

3.11.1.110 Overall, it is predicted that the sensitivity of the receptor is considered to be **very high** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

Further mitigation

3.11.1.111 The finding of a moderate adverse significant impact applies to the River Wensum SAC/SSSI, Booton Common SSSI/Norfolk Valley Fens SAC and Holt Lowes SSSI/Norfolk Valley Fens SAC.

3.11.1.112 River Wensum SAC/SSSI: HDD will be employed under this watercourse. The location of the start and end point of the HDD operation will be carefully selected to ensure that trenching up to the HDD locations will be sufficiently distant from the watercourse that the risk of run-off from trenching reaching the river will be minimised. In addition, the CoCP will include measures to minimise risk of effects from run-off.

3.11.1.113 Booton Common SSSI/Norfolk Valley Fens SAC: There is a break of slope on the southern side of the valley within the refined onshore route corridor that suggests that groundwater flows within the corridor do not feed directly into the SAC/SSSI but run downslope to the Blackwater Drain. The HDD crossing is upstream of the SAC/SSSI but there are no direct surface water flows from the onshore export cable corridor into the valley fen, except for the Blackwater Drain itself. The Blackwater Drain forms the northern boundary of the Booton Common designated site and it is probable that the drain and the fen are hydraulically linked. Further investigation of the hydrology of this area will be undertaken to confirm the hydrological regime and to inform a targeted site-specific plan for trenching and HDD to ensure that run-off from the trenching operations does not reach the designated site.

3.11.1.114 Holt Lowes SSSI/Norfolk Valley Fens SAC: Holt Lowes is approximately 3-4 km downstream along the River Glaven from the cable route. The onshore export cable route crosses a number of small tributary and headwater streams and ditches that flow into the River Glaven. HDD will be employed where practicable but some direct crossing of tributary watercourses is likely to be required. A detailed plan to minimise impacts would be required. Options include carrying out trenching operations when flows are minimal (summer) and pumping or diverting watercourses so that trenching across them is carried out in conditions of no flow.

3.11.1.115 It is anticipated that with appropriate safeguards in place, the residual effects on designated sites will reduce to **minor adverse**, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause damage to habitats from run-off pollutants.**

3.11.1.116 Open cut trenching and cable installation or duct installation and cable pulling could have some impact on sensitive habitats in the vicinity of the works area as a result of potential run-off pollutants, particularly silt or other pollutant deposition into ditches and other watercourses that could potentially cause downstream impacts over a wide area.

3.11.1.117 The main potentially sensitive habitats include broad-leaved semi-natural woodland, hedgerows, heathland, semi-improved and marshy grassland, ponds and watercourses.

3.11.1.118 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats.

Magnitude of impact

3.11.1.119 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.1.120 Habitats are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.121 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables leading to habitat loss and/or severance for a number of species.**

3.11.1.122 Surveys are ongoing for a number of species that are known or likely to be present within the habitat corridor (refer to Section 3.2.1.5 for a list of surveys currently under way). At this stage of the assessment process, it is not possible to assess effects as the extent, location and ecological value of species are not known, and therefore, determining magnitude of impact, sensitivity of receptor and hence significance of impact cannot be carried out. The sections below outline the likely generic effects of cable construction and sets out a brief description of measures likely to be employed to reduce effects (refer also to the list of designed-in mitigation measures set out in Table 3.14).

3.11.1.123 A full assessment of effects on species will be undertaken once surveys are completed (autumn 2017), and will be reported in the Environmental Statement, following stakeholder consultation via the EWG. The consultation exercise will include consultation on the mitigation measures required to address any significant effects identified.

3.11.1.124 A detailed CoCP will be produced prior to construction, informed by surveys carried out in 2017, the assessment of effects and the outcome of consultations with the EWG, and the results of any resurveys where these are necessary.

3.11.1.125 Mitigation works may require appropriate licensing from Natural England.

White-clawed crayfish

3.11.1.126 Records of white-clawed crayfish are known from the River Glaven, including the headwaters both upstream and downstream of the cable corridor. It is therefore possible that this species occurs within the onshore cable corridor search area and hence within watercourses or ditches that would be directly affected by cable installation.

3.11.1.127 It is considered unlikely that crayfish occur in the Wensum or Tud as signal crayfish are known to be present. However, there is potential for remnant populations to occur in tributaries and surveys of suitable habitat will be undertaken to determine whether this is the case.

3.11.1.128 Where possible, HDD will be employed so that watercourses containing crayfish are not affected. However, it may not be possible to HDD under all watercourses supporting this species and therefore measures may need to be taken to remove crayfish from affected areas.

3.11.1.129 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be intermittent over this period and it may be necessary to relocate crayfish from watercourses up to three occasions. Exclusion of crayfish from the works area for the full duration of the maximum construction programme is not considered to be feasible or desirable as it would serve to isolate populations on either side of the cable corridor.

3.11.1.130 Translocation of crayfish, if required, would be carried out under licence from Natural England. Crayfish would need to be relocated into areas of suitable habitat up or downstream of the affected watercourses, enabling re-colonisation of the affected habitat post-restoration.

*Desmoulin's Whorl Snail*

3.11.1.131 Desmoulin's Whorl Snail is a designated feature of the River Wensum SAC/SSSI and the Norfolk Valley Fens SAC/SSSI, although surveys will be undertaken to determine whether this species is present within the sections of these sites that fall within the Ecology and nature conservation study area .

3.11.1.132 There is also potential for the species to occur in areas of suitable habitat outside of these designated sites, and surveys of suitable habitat will be undertaken to determine the locations of any populations in affected areas.

3.11.1.133 HDD will be employed under major watercourses (River Bure, River Wensum, Swannington Beck, River Yare, Intwood Stream, Blackwater Stream and River Tud, and potentially under smaller watercourses where feasible and where the ecological constraints necessitate this approach. Effects on Desmoulin's whorl snail within the designated sites for which it is a feature are therefore not considered likely to occur, but there may be impacts from habitat loss and mortality if the species is found to be present in areas of wet fen habitat that will be affected by open cut trenching.

3.11.1.134 Mitigation would be via translocation of individual snails into adjacent retained habitat and restoration to allow re-colonisation once construction is complete. Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be intermittent over this period and it may be necessary to relocate snails from watercourses up to three occasions. Exclusion of snails from the works area is not considered to be feasible or desirable as it would serve to isolate populations on either side of the onshore export cable corridor.

*GCN*

3.11.1.135 A total of 246 ponds have to date been found suitable for GCN by HSI survey within the Ecology and nature conservation study area and a 250m buffer zone, with a further 141 ponds remaining to be assessed. Ponds with potential to support GCN will be surveyed for presence/absence of GCN, and, where found to present, Population Size Class Assessment. Records of GCN within 2 km of the onshore cable corridor search area were obtained along the whole length of the cable route in the data search, and it is therefore anticipated that GCN will be present in many of the ponds within 250 m of the cable corridor.

3.11.1.136 Wherever possible, the cable route will avoid direct impacts on ponds and on terrestrial habitat around ponds where GCN are shown to be breeding. However, given the number of ponds present within or close to the onshore cable corridor search area, it is unlikely that cable installation can be carried out without requiring temporary loss of GCN habitat.

3.11.1.137 A Natural England licence will therefore be required, with appropriate mitigation to be provided as part of that licence. The scale of mitigation required will vary depending on the size of the populations affected, proximity of the works area to breeding ponds, availability of suitable habitat unaffected by construction and the timing of the works. Mitigation could therefore vary from a simple watching brief and habitat manipulation and hand searches of terrestrial habitat, to erection of exclusion fencing and translocation to offsite receptor sites. Where possible, direct effects could be avoided by carrying out works at a time of year when GCN are not likely to be present.

3.11.1.138 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be intermittent over this period and in some locations it may therefore not be desirable to undertake full restoration of GCN habitat until the end of the construction process. This would avoid the potential need for double or triple handling of large numbers of GCN if they recolonise areas within the cable corridor in between installation phases. In such situations it may be preferable to retain exclusion fencing for the duration of the construction period, although this would need to be balanced against the potential for habitat fragmentation caused by retention of fencing over this period of time. An alternative would be to delay full restoration until the end of the third phase so that habitats remain less suitable for GCN between phases.

3.11.1.139 Given that habitat restoration will be put in place and assuming measures to prevent mortality during the construction process, the overall long-term effect on GCN is not considered likely to be significantly adverse once habitats mature.

*Reptiles*

3.11.1.140 Presence/absence surveys of areas of suitable habitat will be carried out in 2017. Records of reptiles within 2 km of the onshore cable corridor search area were obtained along the whole length of the cable route in the data search, and it is therefore anticipated that reptiles will be present in areas of suitable habitat in many locations along the corridor.

3.11.1.141 Wherever possible, the cable route will avoid direct impacts on reptile habitat where they are found to be present. However, given the amount of potential reptile habitat present within the onshore cable corridor search area, it is unlikely that cable installation can be carried out without requiring temporary loss of reptile habitat.

3.11.1.142 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be intermittent over this period and in some locations it may therefore not be desirable to undertake full restoration of reptile habitat until the end of the construction process. This would avoid the potential need for double or triple handling of reptiles if they recolonise areas within the cable corridor in between installation phases. In such situations it may be preferable to retain exclusion fencing for the duration of the construction period, although this would need to be balanced against the potential for habitat fragmentation caused by retention of fencing over this period of time. An alternative would be to delay full restoration until the end of the third phase so that habitats remain less suitable for reptiles between phases.

3.11.1.143 Given that habitat restoration will be put in place and assuming measures to prevent mortality during the construction process, the overall long-term effect on reptiles is not considered likely to be significantly adverse once habitats mature.

*Breeding birds*

3.11.1.144 It is considered that open cut trenching will have the greatest impact on breeding birds through the loss of habitat and potential displacement. Subsequent visits to the jointing pits to pull cables through installed ducts will not result in any further habitat loss and the area of disturbance will be limited in extent. Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

3.11.1.145 Pre-construction surveys for nesting birds will be undertaken and measures will be set in place to protect active nests until the ECoW has confirmed that young have fully fledged and left the nest.

*Bats*

- 3.11.1.146 Bat records have been obtained along the length of the cable route corridor and it is anticipated that bat activity and static monitoring surveys will find bat activity along a number of hedgerows throughout the route. Eleven species have been recorded from the data search including Barbastelle, Noctule, Common and Soprano Pipistrelle, Brown Long-eared Bat and Myotis bats.
- 3.11.1.147 A number of trees with bat roost potential are present in the PEIR corridor assessment boundary and it is therefore possible that trees containing bat roosts will be lost during cable installation. Trees with roost potential that would be affected by cable installation will be surveyed to determine whether bat roosts are present.
- 3.11.1.148 Where possible, the final cable route will be selected to avoid impacts on mature trees with known or suspected roosts.
- 3.11.1.149 Measures adopted as part of the project, including the use of works-free buffer zones and directional lighting, would protect roosts and minimise the level of disturbance on foraging and potentially roosting bats.
- 3.11.1.150 Open cut trenching would result in the temporary loss of hedgerow habitat of known or potential value to commuting and foraging bats, including some mature hedgerow trees of potential value as bat roosts.
- 3.11.1.151 Most bats tend to fly close to linear features such as significant hedgerows, to forage and commute across the landscape. Gaps of as little as 10 m in length in hedgerows or other habitat corridors can act as barriers to movement of some bat species. Barbastelle, some Myotis species and long-eared bats appear to be more affected by this form of barrier than species such as noctules and pipistrelles, which can travel across open spaces of up to 200 m or more and are more adaptable to a change in commuting route.
- 3.11.1.152 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be continuous over this period and for the length of time it takes for replacement planting at the end of the construction period to mature. This is likely to be in the region of 14-19 years at a minimum, and the effect of severance of large numbers of hedgerows for this length of time is potentially significant. The use of artificial hedgerows to temporarily connect severed hedgerows of high value to foraging and/or commuting bats throughout the construction phase and until reinstatement planting has become sufficiently established will be considered as a possible approach to minimise impacts on foraging and commuting bats.
- 3.11.1.153 Measures adopted as part of Hornsea Three will minimise the impact on all species, including the commitment to trenching during daylight hours and the use of directional lighting, where lighting is required, to minimise light spillage onto adjacent areas of retained habitat of value to bats.

- 3.11.1.154 Cable-pulling operations are expected to have a minimal disturbance impact and will not result in the loss of any further habitat. Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.
- 3.11.1.155 Where practicable, consideration will be given to installing long-lasting woodcrete bat roost boxes in suitable locations on retained mature trees within the cable route corridor to enhance the potential value of the site to roosting bats.
- 3.11.1.156 Measures adopted to minimise the likely impact of potential pollutants on terrestrial and aquatic habitats will also be of value to foraging and commuting bats.

*Water voles*

- 3.11.1.157 Water vole records have been obtained from the data search and it is therefore likely that this species will be present in some watercourses and ditches affected by construction.
- 3.11.1.158 Where possible, HDD will be employed so that watercourses supporting water voles are not affected. However, it may not be possible to HDD under all watercourses supporting this species and therefore measures may need to be taken to remove water voles from affected areas.
- 3.11.1.159 Measures adopted to minimise the impact of works on water voles include: pre-construction surveys to locate new signs of water vole activity; a licenced method statement, designed to deter and where necessary translocate water voles from the works area prior to construction; where practicable the use of 10 m and 50 m buffer zones between watercourses supporting water voles and cable works or the location of trenchless installation launch pits (respectively); measures to minimise the potential impacts of pollutants on watercourses; and directional lighting so as to minimise the disturbance impact of light spill during night time works (if required).
- 3.11.1.160 In addition, works will be carried out under the guidance of an ECoW.
- 3.11.1.161 It is considered that the main impact of works on water voles will result from pre-construction measures designed to temporarily displace or relocate water voles from working areas; remove burrows that might be present within the works corridor; and deter water voles from (re-)excavating burrows within the works corridor. Cable duct installation works on each phase of cabling will cause the main construction-related impact on water voles, primarily due to the potential to disturb water voles. Subsequent visits to install cables within laid ducts will not have a significant impact as no further habitat clearance or trenching will be required and works areas will be limited to areas around jointing pits.

3.11.1.162 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, impacts of habitat loss from cable installation would be intermittent over this period and it may be necessary to exclude water voles from watercourses for the duration of the construction period. Exclusion via fencing from the works area is not considered to be feasible or desirable as it would serve to isolate populations on either side of the cable corridor, but habitat manipulation to prevent development of water vole habitat between phases could be considered. This would need to be balanced against the desirability of restoration in terms of minimising fragmentation impacts for a variety of species and would therefore need to be assessed on a case-by-case basis.

#### Otters

3.11.1.163 Limited numbers of otter records have been obtained from the data search and therefore although it is possible that this species will be present in some watercourses affected by construction, it is not considered likely that significant otter populations will occur.

3.11.1.164 HDD will be employed under main rivers, and where possible under other watercourses supporting otters, therefore reducing impacts. However, it may not be possible to HDD under all watercourses supporting this species and therefore measures may need to be taken to deter otters from affected areas.

3.11.1.165 Measures adopted as part of the project to minimise the impact of works on otters includes pre-construction surveys to locate signs of otter activity, holts or resting places, the covering of deep excavations and duct entrances, and measures to minimise the potential impacts of pollutants on watercourses. Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

3.11.1.166 Works will be carried out under the guidance of an ECoW.

3.11.1.167 For each phase of cabling, it is considered that the impact of works on otters would result from the initial cable duct installation. Subsequent visits to install cables within laid ducts will not have a significant impact due to the fact that no further habitat clearance or trenching will be required and works areas will be limited to areas around jointing pits, which will be located outside the trenchless installation launch pit buffer zones to minimise the potential for impact on resting otters.

#### Potential for open cut trenching and installation of cables to cause disturbance to birds that are designated features of the North Norfolk Coast SPA/Ramsar.

3.11.1.168 Wintering bird surveys have found that Pink-footed Geese use fields within and adjacent to the cable corridor (volume 6, annex 3.1: Onshore Ornithology – Wintering Survey Report). These birds were, in general, present from late November until late January, on sugar beet fields. The vast majority of geese were focused in the coastal area of Weybourne where almost all fields that held sugar beet crop being utilized at some point in the period. The largest field of sugar beet away from the Weybourne area was High Kelling which was utilized by 9,000 geese in early January 2017. No geese were recorded any further south than Hempstead (Field 169) despite sugar beet being available.

3.11.1.169 The maximum count of pink-footed geese recorded during the survey was 10,000. This represents 42% of the five-year peak mean count of this species (23,802) from the North Norfolk Coast SPA citation, or 4.45% of the wintering Eastern Greenland/Iceland/UK population.

3.11.1.170 The area most frequented by the birds comprised beet fields north east of Weybourne. The cable corridor runs through the western edge of the area used by the birds and also through another field immediately south of Kelling Heath where 9000 birds were recorded on one occasion.

3.11.1.171 The presence of a significant percentage of the total SPA population of pink-footed geese over a three month period suggests that the sugar beet fields should be considered as functionally linked habitat associated with the North Norfolk Coast SPA.

3.11.1.172 The geese only feed on sugar beet fields in significant numbers in this area (volume 6, annex 3.1: Onshore Ornithology – Wintering Survey Report), and the habitat preference of this species for winter beet fields have been documented (Gill *et al.*, 1996 and RPSB. 2008). Therefore, the major determinants for the presence of geese are land use and proximity to the coast. There is therefore the possibility that if the landowners rotate crops so that fields affected by cabling are not used for beet at the time of construction, the birds will not be present. Conversely, any arable fields within the coastal zone not currently used for beet that are planted with beet prior to construction are likely to support pink-footed geese. The survey information therefore provides a snapshot of pink-footed goose distribution, but land use and proximity to the coast is likely to enable reasonably accurate predictions of future distribution.

3.11.1.173 Given the quantity of beet fields present in the area, it is not considered that the temporary habitat loss for construction will have any significant effect on the geese. The primary potential impact is therefore disturbance.

#### Magnitude of impact

3.11.1.174 Trenching through beet fields will displace birds from the works corridor itself, and is also likely to disturb birds from using adjacent habitat. The distance of this effect zone is considered likely to be in the region of up to 500 m. Although it is noted in the wintering bird survey report that on one occasion birds were not observed to be displaced by a tractor operating in the field they were grazing, the longer-term and more potentially intrusive nature of the cable installation is more likely to result in birds being disturbed.

3.11.1.175 If the effect zone extended up to 500 m from the route, approximately half of the birds currently using the fields could be disturbed during construction. It is possible that the birds might habituate to the disturbance caused by works to some extent, but nevertheless there is potential for significant disturbance to occur if construction takes place over winter.

3.11.1.176 Given that the maximum design scenario involves a three-phase installation programme over an 11 year period, the maximum potential impact of disturbance from cable installation could be displacement in three years over this period, assuming land use does not change.

3.11.1.177 The impact is predicted to be of district spatial extent, long term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

3.11.1.178 The pink-footed goose population is deemed to be of medium vulnerability, medium recoverability and very high value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.179 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.

*Further mitigation*

3.11.1.180 Options to reduce the magnitude and significance of this effect will be considered further during prior to the final DCO application and discussed via the EWG. These options include:

- Carrying out Trenching operations between Weybourne and Kelling Heath outside of sensitive seasonal windows wherever practically possible to do so within the construction programme; and
- Subject to site conditions and landowner permission at the time of construction, the option to avoid temporary disturbance will be considered. This could be achieved effectively by implementing the use of measures to displace birds from the post-harvest sugar beet tops (crown and leaves) within 500 m of construction activity on functionally linked land, i.e. between Weybourne and Kelling Heath. Measures could be implemented between November and January and could include proven methods such as the installation of scarecrows, large fertiliser sacks and farm machinery, e.g. bowsers, to prevent significant numbers of birds from settling (RSPB, 2008). This would reduce the level of disturbance experienced by the birds by encouraging them to settle on land outside the effect zone, and hence reduce energy expenditure from repeated flushing from land on or adjacent to the cable corridor.

3.11.1.181 With appropriate mitigation measures such as those outlined above, it is considered that the residual impact magnitude could be reduced to **negligible**, and therefore the residual effect would be of **minor** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause habitat loss and disturbance to other wintering birds.**

3.11.1.182 Wintering bird surveys recorded 83 species within the wintering point count surveys along the cable route. Of these species, 46 are considered to be of some conservation value. However, with the exception of pink-footed goose, assessed separately above, none were considered to occur in particularly significant numbers.

3.11.1.183 Species recorded utilising the habitats present on the cable corridor have wide foraging ranges and therefore, could be expected to have high adaptability when avoiding the relatively narrow construction areas and adjacent land.

3.11.1.184 Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

3.11.1.185 Primarily due to the generally low number of wintering and migratory birds recorded during the surveys, the extent of working areas and the availability of alternative suitable habitat in the vicinity, the magnitude of impact of cable installation on wintering and migratory birds will be limited.

Magnitude of impact

3.11.1.186 The impact is predicted to be of district spatial extent, long term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.187 The receptor is deemed to be of moderate vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.188 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for open cut trenching and installation of cables to cause habitat loss and disturbance to badgers.**

3.11.1.189 Badger surveys undertaken along the route to date have identified six badger setts within the onshore cable corridor search area, one of which was disused and one of which was partially used (potentially active which may have been used in the past 12 months but not showing signs of current use).

3.11.1.190 None of the setts were main setts. In addition, foraging signs but no setts were observed in three other locations.

3.11.1.191 Where possible the final cable route will be designed so that no closure of setts will be required, but sett closures would be carried out under licence where necessary.

3.11.1.192 The proximity of the cable route to any active setts may require a disturbance licence if works take place within 30 m of a sett (or less depending on the terrain and ground conditions).

3.11.1.193 Given the maximum design scenario of an 11-year programme with a maximum gap of four years between two phases of cabling, there is clearly potential for badgers to change distribution within the vicinity of the cable route during the construction phase. Pre-construction badger surveys of remaining parts of the cable route and surrounding buffer zone of at least 30 m in width will be undertaken in advance of each phase of cabling in order to locate any new active badger setts and areas of high badger activity.

3.11.1.194 Should an active sett or high levels of badger activity be recorded, a suitably experienced ecologist will assess the likely impacts of the works on the sett or badgers in the area. A Natural England development licence for badgers may be required for works to continue if it is not practicable to establish a 30 m works-free buffer zone between an active sett and the cable trench, or if works are likely to cause significant disturbance to badgers.

3.11.1.195 Should findings of pre-construction surveys confirm high levels of badger activity, where considered necessary by the ECoW to ensure the safety of badgers, badger exclusion fencing will be installed around working areas.

3.11.1.196 Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

Magnitude of impact

3.11.1.197 The impact is predicted to be of local spatial extent, medium term duration, continuous if sett closures are required and intermittent for disturbance impacts and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor** negative.

Sensitivity of receptor

3.11.1.198 Badger populations in the survey area as a whole are deemed to be of moderate vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.199 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for trenchless duct installation and cable pulling beneath watercourses to cause damage and disturbance to designated sites.**

3.11.1.200 Hydrological characterisation of the proposed crossing locations of the EA designated main rivers is currently underway. The work comprises a desk study and site walkover to identify the hydrological and ecological features in these locations and how they interact. Potential constraints will be mapped and will be used to inform the design of the crossing methodologies in these areas. The hydrological characterisation work will be reported in the Environmental Statement, following consultation with the EWG on outputs once complete.

3.11.1.201 HDD is currently proposed for the following watercourses that are or are close to designated sites:

- Blackwater Drain - Booton Common SSSI/Norfolk Valley Fens SAC;
- River Wensum SSSI/SAC; and
- River Tud - Land Adjacent to River Tud CWS.

3.11.1.202 Other locations requiring HDD under watercourses which might affect designated sites (e.g. the River Glaven and associated tributaries which are upstream of the Holt Lowes SSSI/Norfolk Valley Fens SAC) may be identified.

3.11.1.203 The location of the ducts has been selected based on site visits to identify appropriate locations for the ducts and temporary works areas that are outside sensitive habitats.

3.11.1.204 Activities involving the use of trenchless techniques and associated machinery during the construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc., which could affect nearby watercourses. Similarly, the cable route corridor itself could act as a drainage channel, leading to run-off from construction affecting nearby watercourses. However, the construction process will include measures to intercept run-off and ensure that discharges from the site are controlled in quality and volume. This may include the use of settling tanks or ponds to remove sediment, temporary interceptors and a hydraulic brake.

3.11.1.205 Any pollutant impact of cable pulling may result from the potential need to re-open sealed jointing pits, construct new areas of temporary hard-standing for HGVs and any vehicle spillage and leakages.

3.11.1.206 Measures to be adopted will be formalised via the CoCP to control potential pollutants and light spill, in order to limit the potential for, and likely effects of these impacts.

Magnitude of impact

3.11.1.207 The minimum design scenario involves a three-year construction period. The maximum design scenario involves an 11 year construction period with three phases of cabling four years apart, commencing in 2021, so would involve three HDD operations under each watercourse.

3.11.1.208 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.209 The watercourses crossed via trenchless techniques are considered to be moderately vulnerable, but of moderate to high recoverability. The value of the watercourses is determined partly by the designated site status of the watercourse itself or designated sites that are hydrologically linked and close to the HDD locations.

3.11.1.210 The watercourses are deemed to be of medium vulnerability, medium to high recoverability and high value. The maximum sensitivity of the receptors is therefore, considered to be **high**.

Significance of the effects

3.11.1.211 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for trenchless duct installation and cable pulling beneath watercourses to cause damage and disturbance to other watercourses and habitats.**

3.11.1.212 Hydrological characterisation of the proposed crossing locations of the EA designated main rivers is currently underway. The work comprises a desk study and site walkover to identify the hydrological and ecological features in these locations and how they interact. Potential constraints will be mapped and will be used inform the design of the crossing methodologies in these areas. The hydrological characterisation work will be reported in the Environmental Statement, following consultation with the EWG on outputs once complete.

3.11.1.213 In addition to the HDD under designated sites assessed above, HDD is also proposed for the following watercourses:

- River Bure;
- Swannington Beck;
- River Yare; and
- Intwood Stream.

3.11.1.214 Other locations requiring HDD under watercourses (e.g. the River Glaven and associated tributaries) may be identified following the detailed surveys of species (particularly water voles, otters, white-clawed crayfish and Desmoulin's Whorl Snail).

3.11.1.215 The location of the ducts has been selected based on site visits to identify appropriate locations for the ducts and temporary works areas that are outside sensitive habitats.

3.11.1.216 Activities involving the use of trenchless techniques and associated machinery during the construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc., which could affect nearby watercourses. Similarly, the cable route corridor itself could act as a drainage channel, leading to run-off from construction affecting nearby watercourses. However, the construction process will include measures to intercept run-off and ensure that discharges from the site are controlled in quality and volume. This may include the use of settling tanks or ponds to remove sediment, temporary interceptors and a hydraulic brake.

3.11.1.217 Any pollutant impact of cable pulling may result from the potential need to re-open sealed jointing pits, construct new areas of temporary hard-standing for HGVs and any vehicle spillage and leakages.

3.11.1.218 Measures to be adopted will be formalised via the CoCP to control potential pollutants and light spill, in order to limit the potential for, and likely effects of these impacts.

Magnitude of impact

3.11.1.219 The minimum design scenario involves a three-year construction period. The maximum design scenario involves a twelve year construction period with three phases of cabling four years apart, commencing in 2021, so would involve three HDD operations under each watercourse.

3.11.1.220 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.221 The watercourses and associated habitats are deemed to be of medium vulnerability, medium to high recoverability and high medium value. The maximum sensitivity of the receptors is therefore, considered to be **medium**.

Significance of the effects

3.11.1.222 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is significant in EIA terms.

**Potential for trenchless duct installation and cable pulling beneath watercourses to cause habitat loss and disturbance to protected species.**

3.11.1.223 Hydrological characterisation of the proposed crossing locations of the EA designated main rivers is currently underway. The work comprises a desk study and site walkover to identify the hydrological and ecological features in these locations and how they interact. Potential constraints will be mapped and will be used inform the design of the crossing methodologies in these areas. The hydrological characterisation work will be reported in the Environmental Statement, following consultation with the EWG on outputs once complete.

3.11.1.224 Surveys are ongoing for a number of species that are known, or likely to be present in, or adjacent to, watercourses where trenchless techniques will be employed.

3.11.1.225 At this stage of the assessment process, it is not possible to assess effects as the extent, location and ecological value of species are not known and therefore determining magnitude of impact, sensitivity of receptor and hence significance of impact cannot be carried out.

3.11.1.226 One purpose of using trenchless techniques is intended to minimise impacts on species that utilise the watercourses and associated riparian habitats. The location of the ducts has been selected based on site visits to identify appropriate locations for the ducts and temporary works areas that are outside habitats with potential to support protected species. It is therefore expected that impacts of habitat loss from HDD are unlikely to be high, but there is potential for disturbance impacts during the works.

3.11.1.227 The sections below outline the likely generic effects of HDD on the main species considered likely to occur in the vicinity of watercourses, and sets out a brief description of measures likely to be employed to reduce effects (refer also to the list of designed-in mitigation measures set out in Table 3.14).

3.11.1.228 A detailed CoCP will be produced prior to construction, informed by surveys carried out in 2017 and resurveys where necessary.

3.11.1.229 Mitigation works may require appropriate licensing from Natural England.

#### White-clawed crayfish

3.11.1.230 Records of white-clawed crayfish are known from the River Glaven, including the headwaters both upstream and downstream of the cable corridor. It is therefore possible that this species occurs within some watercourses where HDD will be employed.

3.11.1.231 It is considered unlikely that crayfish occur in the Wensum or Tud as signal crayfish are known to be present. However, there is potential for remnant populations to occur in tributaries and surveys of suitable habitat will be undertaken to determine whether this is the case.

3.11.1.232 HDD is unlikely to significantly affect white-clawed crayfish from either direct habitat loss or disturbance during HDD operations.

#### *Desmoulin's Whorl Snail*

3.11.1.233 There is potential for this species to occur in areas of suitable riparian habitat, and surveys of suitable habitat will be undertaken to determine the locations of any populations in affected areas.

3.11.1.234 Direct effects on Desmoulin's whorl snail from HDD are considered unlikely to occur.

#### *Breeding birds*

3.11.1.235 The greatest potential impact on breeding birds is from disturbance during HDD operations. Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works if required. Standard best practice construction methods would minimise impacts from noise and visual disturbance but some residual effects of disturbance on breeding birds is likely. This will be assessed at the ES stage once surveys have been completed.

3.11.1.236 Pre-construction surveys for nesting birds will be undertaken and measures will be set in place to protect active nests until the ECoW has confirmed that young have fully fledged and left the nest.

#### *Bats*

3.11.1.237 Bat records have been obtained along the length of the cable route corridor and it is anticipated that bat activity and static monitoring surveys will find bat activity along a number of watercourses throughout the route. Eleven species have been recorded from the data search including Barbastelle, Noctule, Common and Soprano Pipistrelle, Brown Long-eared Bat and Myotis bats.

3.11.1.238 Measures adopted as part of the project, including the use of works-free buffer zones and directional lighting, would protect roosts and minimise the level of disturbance from light spillage on foraging and potentially roosting bats.

#### *Water voles*

3.11.1.239 Water vole records have been obtained from the data search and it is therefore likely that this species will be present in some watercourses affected by HDD.

3.11.1.240 HDD under watercourses where water voles are present is not likely to cause direct loss of water vole habitat. Disturbance impacts would be minimised via use of directional lighting to minimise light spillage.

3.11.1.241 Measures adopted to minimise the impact of works on water voles include: pre-construction surveys to locate new signs of water vole activity; where practicable the use of 10 m and 50 m buffer zones between watercourses supporting water voles and the location of trenchless installation launch pits; measures to minimise the potential impacts of pollutants on watercourses; and directional lighting to minimise the disturbance impact of light spill during night time works (if required).

3.11.1.242 In addition, works will be carried out under the guidance of an ECoW.

#### *Otters*

3.11.1.243 Limited numbers of otter records have been obtained from the data search and therefore although it is possible that this species will be present in some watercourses affected by construction, it is not considered likely that significant otter populations will occur.

3.11.1.244 HDD under watercourses where otters are present is not likely to cause direct loss of otter habitat. Measures adopted as part of the project to minimise the impact of works on otters includes pre-construction surveys to locate signs of otter activity, holts or resting places, the covering of deep excavations and duct entrances, and measures to minimise the potential impacts of pollutants on watercourses. Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

3.11.1.245 Works will be carried out under the guidance of an ECoW.

**Potential for permanent habitat loss from construction of onshore infrastructure have adverse impacts on habitats.**

- 3.11.1.246 Habitats present in the permanent onshore HVDC converter/HVAC substation site and the permanent HVAC booster station area and associated temporary works area are arable fields and species rich and species poor hedgerows, some of which contain standard trees.
- 3.11.1.247 The arable land is of no significant conservation interest.
- 3.11.1.248 Approximately 435 m of hedgerow lies within the permanent works area for the onshore HVDC converter/HVAC substation, all of which are on the boundaries. Approximately 154 m of hedgerow lies within the permanent works area for the HVAC booster station.
- 3.11.1.249 Hedgerows on the boundary of the works areas would be retained wherever practicable. Hedgerows within the works area will need to be removed. Hedgerows on the boundary between the permanent land-take and associated temporary works areas may also need to be removed during construction.
- 3.11.1.250 Measures adopted as part of Project Two, including the creation of works-free buffer zones and measures to control potential pollutants (airborne and run-off) will limit the impact of works on nearby retained hedgerows and adjacent woodland.
- 3.11.1.251 Landscaping design associated with the onshore HVDC converter/HVAC substation would provide replacement hedgerows if any of the existing boundary hedges are removed for construction.

Magnitude of impact

- 3.11.1.252 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

- 3.11.1.253 The receptor is deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

- 3.11.1.254 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of onshore infrastructure to have adverse impacts on designated sites from airborne pollutants.**

- 3.11.1.255 The onshore HVAC booster station site is immediately adjacent to the New Covert CWS. This site comprises broad-leaved semi-natural woodland and could be affected by airborne pollutants during construction.

- 3.11.1.256 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

- 3.11.1.257 These will include establishment of a buffer zone between the works area and the CWS.

Magnitude of impact

- 3.11.1.258 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

- 3.11.1.259 New Covert CWS is deemed to be of medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

- 3.11.1.260 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of onshore infrastructure to cause damage to designated sites from run-off pollutants.**

- 3.11.1.261 The onshore HVAC booster station is immediately adjacent to the New Covert CWS. This site comprises broad-leaved semi-natural woodland and could be affected by airborne pollutants during construction.

- 3.11.1.262 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent habitats and to limit works areas in order to minimise the potential, for and likely impacts of, run-off pollutants on sensitive habitats within designated sites. This will include the establishment of an appropriate buffer zone between the works area and the New Covert CWS.

- 3.11.1.263 Refer also to volume 3, chapter 2: Hydrology and Flood risk where effects of run-off are considered in more detail.

Magnitude of impact

- 3.11.1.264 The impact is predicted to be of local spatial extent, medium term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

- 3.11.1.265 New Covert CWS is deemed to be of medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.1.266 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of onshore infrastructure to have adverse impacts on habitats from airborne pollutants.**

3.11.1.267 Construction of the onshore HVDC converter/HVAC substation and HVAC booster station could have adverse effects on adjacent habitats, particularly hedgerows and woodland from airborne pollutants (dust generation) during construction.

3.11.1.268 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

3.11.1.269 These will include establishment of a buffer zone between the works area and the adjacent habitats.

3.11.1.270 Effects of dust generation are also considered in volume 3, chapter 9: Air Quality and Health.

Magnitude of impact

3.11.1.271 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.272 Habitats in the vicinity of the onshore HVDC converter/HVAC substation and HVAC booster station construction sites are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.273 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of onshore infrastructure to cause damage to habitats from run-off pollutants.**

3.11.1.274 Construction of the onshore HVDC converter/HVAC substation and HVAC booster station could have adverse effects on adjacent habitats, particularly hedgerows and woodland from run-off pollutants during construction.

3.11.1.275 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent habitats and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats. This will include the establishment of an appropriate buffer zone between the works area and adjacent habitats.

3.11.1.276 Refer also to volume 3, chapter 2: Hydrology and Flood risk where effects of run-off are considered in more detail.

Magnitude of impact

3.11.1.277 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.278 Habitats in the vicinity of the onshore HVDC converter/HVAC substation and HVAC booster station construction sites are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.279 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on species.**

3.11.1.280 Surveys to determine the presence of protected species within areas of permanent and temporary land-take for construction of the onshore HVDC converter/HVAC substation and HVAC booster station are ongoing – refer to Section 3.2.1.5 for a list of surveys currently under way. Until the surveys are complete, a full assessment of the impacts on protected species cannot be undertaken.

3.11.1.281 A full assessment of effects on species will be undertaken once surveys are completed (autumn 2017), and will be reported in the Environmental Statement, following stakeholder consultation with the onshore EWG. The consultation exercise will include consultation on the mitigation measures required to address any significant effects identified.

3.11.1.282 Mitigation measures would be put in place as appropriate for the species concerned. Mitigation for protected species would be of a similar nature to those outlined in paragraphs 3.11.1.223 to 3.11.1.245 above.

**Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on wintering birds.**

- 3.11.1.283 Fifty-one species of bird were recorded within the 40 ha HVAC booster station and associated temporary works area plus 100 m survey buffer zone during wintering bird surveys, of which 24 had some conservation value. Most species were recorded in low numbers, the exception being a count of 1,325 pink-footed geese in November 2016, counts of 1,031 and 372 black-headed gulls in November and December 2016, a count of 606 starlings in November 2016 and a count of 81 lapwing in January 2017.
- 3.11.1.284 Forty-one species of bird were recorded within the onshore HVDC converter/HVAC substation and associated temporary works area plus 100 m survey buffer zone during wintering bird surveys (volume 6, annex 3.1: Onshore Ornithology – Wintering Bird Survey), of which 17 had some conservation value. Most species were recorded in low numbers, with the highest count being 71 lapwing in November 2017.
- 3.11.1.285 Wintering wader species recorded using inland habitats have wide foraging ranges and therefore, could be expected to have high adaptability when avoiding the relatively limited construction areas. The count of pink-footed geese within the onshore HVAC booster station area is unusual in that the vast majority of the records for this species were obtained from the coastal strip. This species uses beet fields and therefore is primarily affected by land use in terms of distribution.
- 3.11.1.286 It is considered that the extent of permanent habitat loss (15.40 ha) for the onshore HVDC converter/HVAC substation and HVAC booster station is of minor concern for wintering birds given the large amount of similar habitat in the wider countryside.
- 3.11.1.287 Construction lighting will be directional so as to minimise the disturbance impact of light spill during night time works.

Magnitude of impact

- 3.11.1.288 The impact of permanent habitat loss is predicted to be of local spatial extent, long term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

- 3.11.1.289 The receptor is deemed to be of moderate vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

- 3.11.1.290 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss from construction of temporary works compounds to have adverse impacts on habitats.**

- 3.11.1.291 At present there are six options for temporary compounds. The following three are definitely required:
- Landfall: location and size not yet determined but within Ecology and nature conservation study area at north end of scheme;
  - HVAC booster station temporary works area; and
  - Onshore HVDC converter/HVAC substation temporary works area.
- 3.11.1.292 There are three options being considered for one additional compound location Old Airfield Solar & Wind Farm,
- Salle A; and
  - Salle B.
- 3.11.1.293 Habitats present in these temporary works areas are arable with some species-rich and species-poor hedgerow, with the exception of the Old Airfield site which as of 2014 was occupied by a free-range chicken farm.
- 3.11.1.294 The arable land and chicken farm are of no significant conservation interest.
- 3.11.1.295 1080 m of hedgerow lies within the temporary works area for the onshore HVDC converter/HVAC substation. 2140 m of hedgerow lies within the temporary works area for the HVAC booster station. 510 m of hedgerow lies within Salle A . There are no hedgerows within Salle B or the Old Airfield The location of the landfall compound is not yet known.
- 3.11.1.296 In addition to the above, there are likely to be other temporary compounds in locations yet to be determined. The maximum design scenario allows for compounds of a minimum of 90 m x 90 m in size at regular intervals along route (indicatively every 2 km) to allow flexibility for the construction; in practice there may be fewer, but compounds are likely to be situated on either sides of major watercourse crossings so that vehicles do not have to travel on the rural road network to cross watercourses.
- 3.11.1.297 Habitats present within these areas would be assessed at a later stage once locations have been firmed up, and impacts addressed as required. They would not be sited within sensitive habitats such as woodland or semi-improved grassland, and would be in locations that minimise loss of hedgerows.
- 3.11.1.298 Hedgerows on the boundary of the compounds would be retained wherever practicable. Any hedgerows removed within the compounds would be restored following completion of construction.
- 3.11.1.299 Measures adopted as part of Hornsea Three, including the creation of works-free buffer zones and measures to control potential pollutants (airborne and run-off) will limit the impact of works on nearby retained hedgerows and adjacent woodland.

3.11.1.300 In the maximum design scenario of a 11 year construction period, the compounds would remain in situ for the duration of the construction of the onshore infrastructure and cabling works. This is likely to be at least 10 years, and therefore habitat loss would be of medium term duration before restoration could be carried out.

Magnitude of impact

3.11.1.301 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.302 The receptor is deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.303 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of temporary works compounds to have adverse impacts on designated sites from airborne pollutants.**

3.11.1.304 The onshore HVAC booster station and works area are immediately adjacent to the New Covert CWS. This site comprised broad-leaved semi-natural woodland and could be affected by airborne pollutants during construction.

3.11.1.305 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

3.11.1.306 These will include establishment of a buffer zone between the works area and the CWS.

3.11.1.307 The onshore HVDC converter/HVAC substation is not close enough for any compounds to affect designated sites.

Magnitude of impact

3.11.1.308 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.1.309 New Covert CWS is deemed to be of medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.1.310 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of temporary compounds to cause damage to designated sites from run-off pollutants.**

3.11.1.311 The HVAC booster station and works area are immediately adjacent to the New Covert CWS. This site comprised broad-leaved semi-natural woodland and could be affected by airborne pollutants during construction.

3.11.1.312 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent habitats and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats within designated sites. This will include the establishment of an appropriate buffer zone between the works area and the New Covert CWS.

3.11.1.313 The onshore HVDC converter/HVAC substation is not close enough to any designated sites for compounds required for its construction to affect designated sites.

3.11.1.314 Temporary compounds for HDD operations will be required. Their locations are not known at this stage but it is assumed that they will be located in areas where run-off into designated sites and sensitive habitats can be avoided.

3.11.1.315 Hydrological characterisation of the proposed crossing locations of the EA designated main rivers is currently underway. The work comprises a desk study and site walkover to identify the hydrological and ecological features in these locations and how they interact. Potential constraints will be mapped and will be used to inform the design of the crossing methodologies in these areas. The hydrological characterisation work will be reported in the Environmental Statement, following consultation with the EWG on outputs once complete

Magnitude of impact

3.11.1.316 The impact is predicted to be of local spatial extent, medium term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.317 New Covert CWS is deemed to be of medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.1.318 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of works compounds to have adverse impacts on habitats from airborne pollutants.**

3.11.1.319 Construction and use of temporary compounds could have adverse effects on adjacent habitats, particularly hedgerows and woodland from airborne pollutants during construction.

3.11.1.320 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

3.11.1.321 These will include establishment of a buffer zone between the works area and adjacent sensitive habitats.

Magnitude of impact

3.11.1.322 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.323 Habitats in the vicinity of the onshore HVDC converter/HVAC substation and HVAC booster station construction sites are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.324 Overall, it is predicted that the sensitivity of the receptor the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction of temporary compounds to cause damage to habitats from run-off pollutants.**

3.11.1.325 Construction and use of temporary compounds could have adverse effects on adjacent habitats, particularly hedgerows and woodland from run-off pollutants during construction.

3.11.1.326 Temporary compounds will be required to facilitate the construction of Hornsea Three. Some of these compounds will be needed for HDD operations and a compound will be located either side of the proposed HDD crossing. At this stage of the design, it has been assumed that HDD techniques will be used for the crossing of main rivers and key infrastructure. Hydrological characterisation work is underway at the crossing locations of the main rivers to guide the location of the HDD compounds. The result of this work will be presented in the Environmental Statement. Other compounds will also be required and their location will be identified in the Environmental Statement. They will be located in areas where run-off into designated sites and sensitive habitats can be avoided.

3.11.1.327 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent habitats and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats. This will include the establishment of an appropriate buffer zone between the works area and adjacent habitats.

Magnitude of impact

3.11.1.328 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.329 Habitats in the vicinity of the onshore HVDC converter/HVAC substation and HVAC booster station construction sites are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.330 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss from construction of works compounds to have adverse impacts on species.**

3.11.1.331 Surveys to determine the presence of protected species within areas of permanent and temporary land-take for construction of the onshore HVDC converter/HVAC substation and HVAC booster station are ongoing – refer to Section 3.2.1.5 for a list of surveys currently under way. Until the surveys are complete, a full assessment of the impacts on protected species cannot be undertaken.

3.11.1.332 A full assessment of effects on species will be undertaken once surveys are completed (autumn 2017), and will be reported in the Environmental Statement following stakeholder consultation via the EWG. The consultation exercise will include consultation on the mitigation measures required to address any significant effects identified.

3.11.1.333 Mitigation measures would be put in place as appropriate for the species concerned. Mitigation for protected species would be of a similar nature to those outlined in paragraphs 3.11.1.223 to 3.11.1.245 above.

**Potential for temporary habitat loss from construction of works compounds to have adverse impacts on wintering birds.**

3.11.1.334 Fifty-one species of bird were recorded within the HVAC booster station and associated temporary works area plus 100 m survey buffer zone during wintering bird surveys, of which 24 had some conservation value. Most species were recorded in low numbers, the exception being a count of 1,325 pink-footed geese in November 2016, counts of 1,031 and 372 black-headed gulls in November and December 2016, a count of 606 starlings in November 2016 and a count of 81 lapwings in January 2017.

3.11.1.335 Forty-one species of bird were recorded within the onshore HVDC converter/HVAC substation site and associated temporary works area plus 100 m survey buffer zone during wintering bird surveys (Volume 6 Annex 3.2: Onshore Ornithology – Wintering Survey Report), of which 17 had some conservation value. Most species were recorded in low numbers, with the highest count being 71 lapwings in November 2017.

3.11.1.336 Wintering wader species recorded using inland habitats have wide foraging ranges and therefore, could be expected to have high adaptability when avoiding the relatively limited construction areas. The count of pink-footed geese within the HVAC booster station area is unusual in that the vast majority of the records for this species were obtained from the coastal strip. This species uses beet fields and therefore is primarily affected by land use in terms of distribution.

3.11.1.337 In the maximum design scenario of an 11 year construction period, the compounds would remain in situ for the duration of the construction of the onshore infrastructure and cabling works. This is likely to be at least 10 years, and therefore habitat loss would be of medium term duration before restoration could be carried out.

3.11.1.338 It is considered that the extent of temporary habitat loss (9.11 ha) for works compounds is of minor concern for wintering birds given the large amount of similar habitat in the wider countryside.

Magnitude of impact

3.11.1.339 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.340 The receptor is deemed to be of moderate vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.341 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss from construction of access tracks to have adverse impacts on designated sites.**

3.11.1.342 The maximum design scenario allows for up to two haul roads, each of 5 m width, to be constructed along the route. There may also be offline haul routes depending on locations of temporary compounds (the Old Airfield Solar & Wind Farm, section 3.11.1.291) but the locations have yet to be determined.

3.11.1.343 The locations of the haul roads has yet to be determined but would be within the ecology and nature conservation study area and selected as far as practicable to avoid designated sites.

3.11.1.344 There are three designated sites that cross the entirety of the onshore cable corridor search area where temporary haul roads may need to be constructed. These are:

- Dismantled Railway CWS;
- Marriot's Way CWS (two locations); and
- Low Common CWS.

3.11.1.345 Of these, the Dismantled Railway CWS and Marriot's Way CWS comprise tracks with tall ruderal and trees on either side. Provided that the access track locations are selected to avoid or minimise loss of mature trees wherever possible, impacts of habitat loss would be minor.

3.11.1.346 Low Common SSSI comprises a mosaic of grassland, fen and woodland with wet ditches. Construction of haul roads across this site would therefore represent a potentially more significant impact. Cabling may be installed under Low Common by trenchless techniques, but it may be necessary to install a haul road in this location.

3.11.1.347 In the maximum design scenario of an 11 year construction period, the haul roads would be required for each of the three cabling phases, and therefore even if interim restoration is carried out between phases, permanent restoration would not be put in place until at least 10 years from construction of the first phase, and therefore habitat loss would be of long term duration before restoration could be carried out.

Magnitude of impact

3.11.1.348 For Marriot's Way CWS and Dismantled Railway CWS, the impact is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **minor**.

3.11.1.349 For Low Common CWS, the impact is predicted to be of local spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

3.11.1.350 The receptors are deemed to be of medium vulnerability, medium recoverability and county value. The sensitivity of the receptors are therefore, considered to be **medium**.

Significance of the effects

3.11.1.351 For Marriott's Way CWS and Dismantled Railway CWS, it is predicted that the sensitivity of the receptors is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

3.11.1.352 For Low Common CWS, it is predicted that the sensitivity of the receptors is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

Further mitigation

3.11.1.353 In the maximum design scenario of three cabling phases, the haul roads across designated sites would be required for each phase.

3.11.1.354 In order to reduce this impact, the section of haul road across the sites would be restored in between each phase of construction. This would include removing the road surface and any temporary ditch crossings, therefore reducing the longer-term fragmentation effect on watercourses and other habitats on site.

3.11.1.355 Including this mitigation measure for the Dismantled Railway and Marriott's Way CWSs, the impact is predicted to be of local spatial extent, long term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **negligible**.

3.11.1.356 For Low Common CWS, it is predicted that the sensitivity of the receptors is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss from construction of access tracks to have adverse impacts on habitats.**

3.11.1.357 The maximum design scenario allows for up to two haul roads, each of 5 m width, to be constructed along the route, comprising 600 m crushed aggregate on geotextile or soil stabilisation.

3.11.1.358 The locations of the haul roads has yet to be determined but are assumed to be within the Ecology and nature conservation study area and would be selected as far as practicable to avoid designated sites and sensitive habitats such as hedgerows and woodland.

3.11.1.359 In the maximum design scenario of an 11-year construction period with 4 years between cabling phases, the haul roads could remain in situ for the duration of the construction of the onshore infrastructure and cabling works, although could be restored and relaid between phases. Therefore habitat loss could be of medium term duration before permanent restoration could be carried out.

3.11.1.360 Sections of hedgerow removed for construction of haul roads would be reinstated at the end of the construction period.

Magnitude of impact

3.11.1.361 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.362 The receptors are deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.363 Overall, it is predicted that the the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for construction and use of access tracks to have adverse impacts on designated sites from airborne pollutants.**

3.11.1.364 In areas where the haul roads would run close to designated sites, there is potential for sites to be affected by airborne pollutants during construction, predominantly dust.

3.11.1.365 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

3.11.1.366 These will include establishment of a buffer zone between access tracks and any adjacent designated sites.

3.11.1.367 Effects of dust generation are also considered in volume 3, chapter 9: Air Quality and Health.

Magnitude of impact

3.11.1.368 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.1.369 Designated sites are deemed to be of medium to high vulnerability, moderate recoverability and between county to international value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.370 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Potential for construction and use of access tracks to cause damage to designated sites from run-off pollutants.

3.11.1.371 In areas where the haul roads would run close to designated sites, there is potential for sites to be affected by run-off pollutants during construction or use.

3.11.1.372 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent designated site and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats within designated sites. This will include the establishment of an appropriate buffer zone between the access tracks and adjacent designated sites.

Magnitude of impact

3.11.1.373 The impact is predicted to be of local spatial extent, medium term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.374 Designated sites are deemed to be of medium to high vulnerability, moderate recoverability and between county to international value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.375 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Potential for construction and use of access tracks to have adverse impacts on habitats from airborne pollutants.

3.11.1.376 Construction and use of access tracks could have adverse effects on adjacent habitats, particularly hedgerows and woodland from airborne pollutants during construction.

3.11.1.377 Measures will be adopted and documented in a CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.

3.11.1.378 These will include establishment of a buffer zone between the access tracks and adjacent sensitive habitats.

Magnitude of impact

3.11.1.379 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.380 Habitats in the vicinity of the access tracks are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.381 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Potential for construction and use of access tracks to cause damage to habitats from run-off pollutants.

3.11.1.382 Construction and use of access tracks could have adverse effects on adjacent habitats, particularly hedgerows and woodland from run-off pollutants during construction.

3.11.1.383 Measures will be adopted and documented in a CoCP to minimise risk of run-off pollutants reaching adjacent habitats and to limit works areas in order to minimise the potential for and likely impacts of run-off pollutants on sensitive habitats. This will include the establishment of an appropriate buffer zone between the access tracks and adjacent habitats.

Magnitude of impact

3.11.1.384 The impact is predicted to be of local spatial extent, medium term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.1.385 Habitats in the vicinity of the access tracks are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effects

3.11.1.386 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss from construction of access tracks to have adverse impacts on species.**

3.11.1.387 Surveys to determine the presence of protected species within areas of temporary land-take for construction of access tracks are ongoing. Until the surveys are complete, a full assessment of the impacts on protected species cannot be undertaken.

3.11.1.388 Mitigation measures would be put in place as appropriate for the species concerned. Mitigation for protected species would be of a similar nature to those outlined in Table 3.14.

**Potential for temporary habitat loss and disturbance from construction and use of access tracks to have adverse impacts on wintering pink-footed goose.**

3.11.1.389 As with the assessment of impacts of trenching on pink-footed goose (paragraphs 3.11.1.168 to 3.11.1.181), the construction and use of the access track could result in disturbance to the large flocks of pink-footed geese that were recorded using beet fields at the north end of the cable route. A significant proportion of the North Norfolk Coast SPA population of pink-footed geese have been observed to use fields in or close to the works area.

3.11.1.390 In the maximum design scenario of an 11 year construction period, the access track would remain in situ for the duration of the construction of the onshore infrastructure and cabling works. It is not considered that habitat loss itself would be a significant issue, but disturbance could occur if installation of cables occurs between November – January. With a three phase construction period, there could be a maximum of three disturbance events during construction if cabling works take place over winter in each phase.

Magnitude of impact

3.11.1.391 The impact is predicted to be of district spatial extent, long term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

3.11.1.392 The pink-footed goose population is deemed to be of medium vulnerability, medium recoverability and very high value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.1.393 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **major adverse** significance, which is significant in EIA terms.

Further mitigation

3.11.1.394 Options to reduce the magnitude and significance of this effect will be considered further during prior to the final DCO application and discussed via the EWG. These options include:

- Carrying out Trenching operations between Weybourne and Kelling Heath outside of sensitive seasonal windows wherever practically possible to do so within the construction programme.
- Subject to site conditions and landowner permission at the time of construction, the option to avoid temporary disturbance will be considered. This could be achieved effectively by implementing the use of measures to displace birds from the post-harvest sugar beet tops (crown and leaves) within 500 m of construction activity on functionally linked land, i.e. between Weybourne and Kelling Heath. Measures could be implemented between November and January and could include proven methods such as the installation of scarecrows, large fertiliser sacks and farm machinery, e.g. bowsers, to prevent significant numbers of birds from settling (RSPB, 2008). This would reduce the level of disturbance experienced by the birds by encouraging them to settle on land outside the effect zone, and hence reduce energy expenditure from repeated flushing from land on or adjacent to the cable corridor.

3.11.1.395 With appropriate mitigation measures such as those outlined above, it is considered that the residual impact magnitude could be reduced to **negligible**, and therefore the residual effect would be of **minor** significance, which is not significant in EIA terms.

**Potential for temporary habitat loss and disturbance from construction and use of access tracks to have adverse impacts on wintering birds.**

3.11.1.396 Wintering wader species recorded using inland habitats have wide foraging ranges and therefore, could be expected to have high adaptability when avoiding the relatively limited construction areas. The count of pink-footed geese within the HVAC booster station area is unusual in that the vast majority of the records for this species were obtained from the coastal strip. This species uses beet fields and therefore is primarily affected by land use in terms of distribution.

3.11.1.397 In the maximum design scenario of an 11 year construction period, the access track would remain in situ for the duration of the construction of the onshore infrastructure and cabling works. It is not considered that habitat loss itself would be a significant issue, but disturbance could occur if installation of cables occurs over winter. With a three phase construction period, there could be a maximum of three disturbance events between 2021 and 2029 if cabling works take place over winter in each phase.

3.11.1.398 It is considered that the likely extent of temporary habitat loss for access tracks is of minor concern for wintering birds given the large amount of similar habitat in the wider countryside.

Magnitude of impact

3.11.1.399 The impact is predicted to be of district spatial extent, long term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**

Sensitivity of receptor

3.11.1.400 The receptor is deemed to be of moderate vulnerability, moderate recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**

Significance of the effects

3.11.1.401 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Future monitoring**

3.11.1.402 The requirement for monitoring of species during the construction phase will be determined by the results of the surveys and the mitigation measures that need to be put in place for protected species. At this stage, therefore, detailed specifications for monitoring have not been produced.

3.11.1.403 In general, any mitigation works carried out under Natural England licences (badger, GCN, bats, water voles and Otters) are likely to require some follow-up monitoring to assess the success or otherwise of mitigation measures.

3.11.1.404 In the maximum design scenario of an 11 year two or three phase cable installation programme, it will be necessary to undertake repeat surveys for presence/absence of protected species in advance of each phase of cable installation, to ensure that any changes in species' distributions are identified and mitigation measures implemented as necessary.

3.11.1.405 Monitoring of habitats during the construction phase would include:

- Assessment of water quality downstream of crossing points: regular visual inspections for signs of siltation requiring remediation.
- Assessment of success of habitat restoration within designated sites (as appropriate) or other sensitive habitats.

3.11.1.406 Details of agreed monitoring programmes will be summarised in the CoCP and reviewed at the end of each cable installation phase.

**3.11.2 Operational and maintenance phase**

3.11.2.1 The impacts of the onshore operation and maintenance of Hornsea Three have been assessed on ecology and nature conservation. The environmental impacts arising from the operation and maintenance of Hornsea Three are listed in Table 3.10 along with the maximum adverse scenario against which each operation and maintenance phase impact has been assessed.

3.11.2.2 A description of the potential effect on ecology and nature conservation receptors caused by each identified impact is given below.

**Potential for operation to result in low-level visual disturbance, and noise and vibration disturbance of habitats and species during routine maintenance operations.**

3.11.2.3 Regular inspections of the onshore cable, approximately every two to five years, will be undertaken via the link boxes. Should repairs to the cable become necessary; the cable will be accessed at the relevant jointing bays and pulled between them. Jointing bays will remain in place during operation. Access to the link boxes, jointing pits and transition joint bays will be via existing roads, tracks and field gates, with the permission of the landowner. These visits will be made by light vehicles only. In the unlikely event that a larger vehicle is required to access the jointing pits or transition bays, and existing roads and tracks do not allow suitable access, a temporary metal track (or similar) would be constructed to gain access. Any possible impacts will be kept to a minimum.

3.11.2.4 The onshore HVAC booster station and onshore substation will be designed to be unmanned during operation. Maintenance visits will be monthly. These visits are likely to be made by light vehicles only and would use the constructed road networks and the permanent access tracks constructed as part of the project.

3.11.2.5 Any activity is likely to be undertaken during daylight hours. Lighting will be limited to that required for maintenance only and to light pathways for health and safety purposes. No night time lighting is likely to be required on a routine basis and therefore, operational maintenance is not likely to cause significant disturbance to crepuscular or nocturnal species.

3.11.2.6 No new significant damage or disruption to existing or reinstated habitats is anticipated during this period.

Magnitude of impact

3.11.2.7 The impact is predicted to be of local spatial extent, short term duration, intermittent and moderate reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.2.8 The sensitivities of individual receptors are described under the impacts of construction section above.

3.11.2.9 Designated sites and habitats of conservation importance along the route and in the surrounding area are of up to very high vulnerability, low recoverability, and international value. Sensitivities vary from low to very high.

3.11.2.10 Sensitivity of populations of the majority of protected species in the area are yet to be determined but are likely to be of various levels of sensitivity; up to moderate vulnerability, low recoverability and up to international value. Sensitivities vary from **low** to **very high**.

Significance of the effects

3.11.2.11 Overall, it is predicted that the sensitivity of the receptor is considered to be up to **very high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible** to **minor adverse** significance, which is not significant in EIA terms.

**Potential for operation to result in potential contamination of habitats and watercourses through accidental spillage of chemicals or fuels during routine maintenance operations, and/or increased sedimentation as a result of physical disturbance of soils.**

3.11.2.12 During the operational phase of the HVAC booster station and onshore HVDC converter/HVAC substation, the main impacts arise during onsite maintenance activities and the potential discharge of untreated run-off.

3.11.2.13 New Covert CWS is adjacent to the HVAC booster station. There are no designated sites adjacent to the onshore HVDC converter/HVAC substation. There are no significant watercourses close to either the HVAC booster station or onshore HVDC converter/HVAC substation that could be affected by accidental pollution incidents during operation.

3.11.2.14 The potential for adverse impacts on habitats of conservation interest is therefore limited.

Magnitude of impact

3.11.2.15 The impact is predicted to be of local/ spatial extent, short/ term duration, intermittent and medium reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.2.16 The receptors are deemed to be of medium vulnerability, medium recoverability and up to county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.2.17 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

**Potential for permanent habitat loss from construction of onshore infrastructure have adverse impacts on habitats.**

3.11.2.18 The operational and maintenance phase of Hornsea Three will lead to the permanent loss of habitats during the project lifetime, on the areas occupied by the HVAC Booster Station and HVDC Converter/HVAC Substation.

3.11.2.19 The impacts will be the same as those discussed in paragraph 3.11.1.245 to 3.11.1.253 above.

**Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on species.**

3.11.2.20 The operational and maintenance phase of Hornsea Three will lead to the permanent loss of habitats during the project lifetime, affecting species, on the areas occupied by the HVAC Booster Station and HVDC Converter/HVAC Substation.

3.11.2.21 The impacts will be the same as those discussed in paragraph 3.11.1.280 to 3.11.1.282 above.

**Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on wintering birds.**

3.11.2.22 The operational and maintenance phase of Hornsea Three will lead to the permanent loss of habitats during the project lifetime, affecting wintering birds, on the areas occupied by the HVAC Booster Station and HVDC Converter/HVAC Substation.

3.11.2.23 The impacts will be the same as those discussed in paragraph 3.11.1.283 to 3.11.1.290 above.

**Future monitoring**

3.11.2.24 As per section 3.11 above.

**3.11.3 Decommissioning phase**

3.11.3.1 The impacts of the onshore decommissioning of Hornsea Three have been assessed on ecology and nature conservation. The environmental effects arising from the decommissioning of Hornsea Three are listed in Table 3.14 along with the maximum adverse scenario against which each decommissioning phase impact has been assessed.

3.11.3.2 Taking into account the time delay between construction and decommissioning and the commitment to reinstatement of habitats lost due to construction, for the purpose of this assessment it is assumed that ecological baseline conditions during decommissioning will be similar to those assessed for construction in terms of the species likely to be present and the ecological value of those populations or assemblages. Species distributions and numbers may change due to natural population fluctuations, but any changes in distribution would need to be determined by surveys prior to decommissioning.

3.11.3.3 It is assumed that consultation would be undertaken with Natural England and other members of the EWG and the relevant Local Authorities prior to the commencement of decommissioning, to determine the exact nature of the decommissioning plan, and applicable regulations would be followed to minimise environmental effects. It is currently assumed that cable ducts will be left in place in the ground, with ends sealed and securely buried (unless suitable with minimal disturbance to remove and refill ducts) in certain sections. If complete decommissioning is required, the HVAC booster station and onshore HVDC converter/HVAC substation will be demolished and the sites cleared and reinstated to its original condition or for alternative use. It is presumed that no additional hedgerow or tree clearance will be required.

3.11.3.4 Works will be undertaken in accordance with best practice guidelines and legislative requirements which apply at the time.

3.11.3.5 A description of the potential effect on ecology and nature conservation receptors caused by each identified impact is given below.

**Potential for decommissioning of cables to affect designated sites.**

3.11.3.6 As it assumed that cable ducts will be left in situ, and that jointing pits and link boxes will be situated outside designated sites, there should be no direct impacts from habitat loss inside designated sites.

3.11.3.7 There is potential for some impacts from airborne or run-off pollution during decommissioning works to affect designated sites in the vicinity of the works area. A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

Magnitude of impact

3.11.3.8 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.3.9 Designated sites are deemed to be of up to high vulnerability, low recoverability and very high value. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effects

3.11.3.10 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for decommissioning of cables to affect habitats.**

3.11.3.11 It is assumed that no additional hedgerow or woodland clearance would be required for cable decommissioning works.

3.11.3.12 As it assumed that cable ducts will be left in situ, direct impacts on habitats would be limited to those required to remove jointing pits and link boxes, and any construction of temporary access tracks required in order facilitate these works. There should therefore be minimal direct loss of habitats of conservation interest as a result of decommissioning.

3.11.3.13 There is potential for some impacts from airborne or run-off pollution during decommissioning works to affect habitats sites in the vicinity of the works area. A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

Magnitude of impact

3.11.3.14 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.3.15 Designated sites are deemed to be of up to high vulnerability, low recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.3.16 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

**Potential for decommissioning of cables to affect species.**

3.11.3.17 Decommissioning of cables has the potential to affect species, primarily through disturbance but potentially also through temporary habitat loss from construction of access tracks for vehicular access to jointing pits and link boxes.

3.11.3.18 A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

3.11.3.19 Overall, impacts from cable decommissioning would be considerably lower than impacts from cable construction.

Magnitude of impact

3.11.3.20 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

3.11.3.21 The sensitivity of majority of species receptors will be determined following surveys.

3.11.3.22 Of those species for which surveys have been completed, it is known that populations of pink-footed goose on fields at the north end of the cable are of **high** sensitivity,

Significance of the effects

3.11.3.23 Overall, it is predicted that the sensitivity of at least one species receptor is considered to be **high** and the magnitude is deemed to be **minor**. The effect will, therefore, be of up to **moderate adverse** significance, which is significant in EIA terms.

3.11.3.24 Based on current information on species, this moderate adverse effect is predicted for wintering pink-footed goose populations at the coastal end of the cable. In most cases it is expected that effects will be **minor adverse**.

Further mitigation

3.11.3.25 Pre-commencement surveys to update information on the distribution of species would be carried out, and appropriate mitigation adopted where necessary.

3.11.3.26 For example, if significant counts of pink-footed geese are still shown to be using fields at the coastal end of the cable, impacts would be avoided by carrying out decommissioning works outside of the wintering period. This would reduce the effect significance to **negligible** for this species.

Potential for decommissioning of onshore HVAC booster station and onshore HVDC converter/HVAC substation to affect designated sites.

3.11.3.27 There are no designated sites close to the onshore HVDC converter/HVAC substation that could be affected by decommissioning.

3.11.3.28 The onshore HVAC booster station is adjacent to the New Covert CWS. There is therefore some potential for impacts from airborne or run-off pollution during decommissioning works to affect this designated site

3.11.3.29 A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

Magnitude of impact

3.11.3.30 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.3.31 Designated sites are deemed to be of up to medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.3.32 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Potential for decommissioning of onshore HVAC booster station and onshore HVDC converter/HVAC substation to affect habitats.

3.11.3.33 It is assumed that no additional hedgerow or woodland clearance would be required for decommissioning works.

3.11.3.34 There is potential for some impacts from airborne or run-off pollution during decommissioning works to affect habitats sites in the vicinity of the works area.

3.11.3.35 A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

Magnitude of impact

3.11.3.36 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

3.11.3.37 Habitats are deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effects

3.11.3.38 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Potential for decommissioning of onshore HVDC converter/HVAC substation and HVAC booster station to affect species.

3.11.3.39 Decommissioning has the potential to affect species, primarily through disturbance but potentially also through temporary habitat loss from construction of access tracks for vehicular access to jointing pits and link boxes.

3.11.3.40 A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.

3.11.3.41 Overall, impacts from cable decommissioning would be considerably lower than impacts from cable construction.

3.11.3.42 A full assessment of decommissioning impacts will be undertaken once full survey results have been provided.

*Future monitoring*

3.11.3.43 Requirements for future monitoring would be determined by results of pre-commencement ecology surveys and formalised via the production of a CoCP.

## 3.12 Cumulative Effect Assessment methodology

### 3.12.1 Screening of other projects and plans into the Cumulative Effect Assessment

3.12.1.1 The Cumulative Effect Assessment (CEA) takes into account the impact associated with Hornsea Three together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of the 'CEA long list' of projects (see volume 4, annex 5.1 and 5.2: Cumulative Effects Screening Matrix and Location of Schemes). Each project on the CEA long list has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

3.12.1.2 In undertaking the CEA for Hornsea Three, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside Hornsea Three. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with Hornsea Three (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors. For this reason, all relevant projects and plans considered cumulatively alongside Hornsea Three have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the CEA to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each Tier in the decision making process when considering the potential cumulative impact associated with Hornsea Three (e.g. it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2). An explanation of each tier is included below:

- Tier 1: Hornsea Three considered alongside other project/plans currently under construction and/or those consented but not yet implemented, and/or those submitted but not yet determined and/or those currently operational that were not operational when baseline data was collected, and/or those that are operational but have an on-going impact;
- Tier 2: All projects/plans considered in Tier 1, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has submitted a Scoping Report; and

- Tier 3: All projects/plans considered in Tier 2, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has advised PINS in writing that they intend to submit an application in the future but have not submitted a Scoping Report.

3.12.1.3 The specific projects scoped into this CEA and the Tiers into which they have been allocated, are outlined in Table 3.17. The projects included as operational in this assessment have been commissioned since the baseline studies for this project were undertaken and as such were excluded from the baseline assessment.

Table 3.17: List of other projects and plans (with planning application reference) considered within the CEA.

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase
1	<i>Residential development</i>						
	Construction and Maintenance/Decommissioning	Land North And South Of Dereham Road 2014/2611	0 m	The erection of 890 dwellings; the creation of a village heart to feature an extended primary school, a new village hall, a retail store and areas of public open space; the relocation and increased capacity of the allotments; and associated infrastructure including public open space and highway works.	Approved 01-Nov-16	Possible	Yes
	Construction and Maintenance/Decommissioning	Phase A1-A Land North Of Hethersett Village Centre 2015/1594 and 2015/1681	133 m	Residential development of 95 dwellings with associated open space and infrastructure. Reserved matters for appearance, layout, and scale and landscaping of the first phase of development for 126 dwellings in relation to outline permission 2011/1804.	Approved 18-Dec-15 Reserved matters Approved 18-Feb-16	Possible	Yes
	Construction and Maintenance/Decommissioning	Land South East Of The Gardens Mill Road 2015/2630	70 m	Residential Development for 8 dwellings, car parking and amenity space including 2 affordable dwellings which form part of planning reference 2015/0253.	Approved 30-Aug-16	Possible	Yes
	Construction and Maintenance/Decommissioning	Land North Of Gibbs Close 2015/1697 and 2012/1836	295 m	Erection of 27 dwellings, access, roads, open space, parking areas and associated works. Outline application for residential development (20 Dwellings) and associated infrastructure works, including highway improvement works at the Mill Road/School Lane/Burnthouse Lane junction.	Approved 27-Jun-16 Approved 29-Apr-14	Possible	Yes
	Construction and Maintenance/Decommissioning	Land South Of Ringwood Close 2013/0092	1 m	Outline application for up to 20 residential units and associated highways works with all matters reserved.	Approved 20-Mar-14	Possible	Yes
	Construction and Maintenance/Decommissioning	Land South East Of The Gardens Mill Road 2013/0086	70 m	Outline application including means of access for residential development and ancillary works.	Approved 30-Apr-14	Possible	Yes
	<i>Change of land use</i>						
Operational	Land at Pitt Farm PF/12/1263	0 m	Change of use of land from agriculture to 53 units tent-only campsite and formation of vehicular access.	Approved 24/01/2013	No	Yes	

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase
<i>Commercial development</i>							
		Mangreen Quarry, Swardeston C/7/2014/7030	0 m	(I) For a southern extension to Mangreen Quarry and ancillary works with progressive restoration to agriculture and nature conservation by the importation of inert restoration materials; (II) Retention of existing consented facilities at Mangreen Quarry; (III) Establishment of crossing point over Mangreen Lane; and (IV) Proposed variation to approved restoration scheme at Mangreen Quarry	Approved 02-Oct-15	Yes	Yes
		Land off Church Lane 20170052	253 m	Greater Norwich Food Enterprise Zone	Pending Consideration (when checked on 02-Feb-17)	Possible	Yes
<i>Offshore wind farm</i>							
2	Construction and Maintenance/Decommissioning	Norfolk Vanguard EN010079	0 m	Norfolk Vanguard is a proposed offshore windfarm with an approximate capacity of 1800 MW off the coast of Norfolk.	Currently at Pre-Application Stage Application expected to be submitted to the PINS in Q2 2018	Yes	Yes

### 3.12.2 Maximum design scenario

- 3.12.2.1 The maximum adverse scenarios identified in Table 3.18 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative impact presented and assessed in this section have been selected from the details provided in the Hornsea Three project description (volume 1, chapter 3: Project Description), as well as the information available on other projects and plans, in order to inform a 'maximum adverse scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), to that assessed here be taken forward in the final design scheme.
- 3.12.2.2 Given that the main cabling works will result in temporary habitat loss rather than permanent habitat losses, it is considered that the potential for cumulative impacts is restricted to cumulative effects of habitat loss or disturbance to species in the event that the construction period for developments included in the cumulative assessment overlaps with cable installation. In this event there would be a greater potential for displacement or disturbance for species.
- 3.12.2.3 At present there is insufficient information on the timing of construction for the developments listed in Table 3.17 to be able to determine whether overlap with cabling works would occur. The maximum design scenario for Hornsea Three is for three phases of cabling four years apart. There are therefore three potential windows for overlap with construction of developments close to the cable route.

Potential impact	Maximum adverse scenario	Justification
	Tier 2 • Norfolk Vanguard	
<i>Operation phase</i>		
Potential for operation to result in low-level visual disturbance, and noise and vibration disturbance of habitats and wildlife during routine maintenance operations	Tier 1 • Land off Rectory Road and Holt Road; • Land North And South Of Dereham Road; • Phase A1-A Land North Of Hethersett Village Centre; • Land South East Of The Gardens Mill Road; • Land North Of Gibbs Close; • Land South Of Ringwood Close; • Land South East Of The Gardens Mill Road; • Proposed Northern Distributor Road; • Land at Pitt Farm; • Mangreen Quarry, Swardeston; and • Land off Church Lane. Tier 2 • Norfolk Vanguard	Outcome of the CEA will be greatest when the greatest number of other schemes, present or planned, are considered.
<i>Decommissioning phase</i>		
Potential for decommissioning of cables to affect species	Tier 1 • Land off Rectory Road and Holt Road; • Land North And South Of Dereham Road; • Phase A1-A Land North Of Hethersett Village Centre; • Land South East Of The Gardens Mill Road; • Land North Of Gibbs Close; • Land South Of Ringwood Close; • Land South East Of The Gardens Mill Road; • Proposed Northern Distributor Road; • Land at Pitt Farm; • Mangreen Quarry, Swardeston; and • Land off Church Lane. Tier 2 • Norfolk Vanguard	Outcome of the CEA will be greatest when the greatest number of other schemes, present or planned, are considered.

Table 3.18: Maximum adverse design scenario considered for the assessment of potential cumulative impacts on ecology and nature conservation.

Potential impact	Maximum adverse scenario	Justification
<i>Construction phase</i>		
Potential for open cut trenching and installation of cables leading to habitat loss and/or severance for a number of species	Tier 1 • Land off Rectory Road and Holt Road; • Land North And South Of Dereham Road; • Phase A1-A Land North Of Hethersett Village Centre; • Land South East Of The Gardens Mill Road; • Land North Of Gibbs Close; • Land South Of Ringwood Close; • Land South East Of The Gardens Mill Road; • Proposed Northern Distributor Road; • Land at Pitt Farm; • Mangreen Quarry, Swardeston; and • Land off Church Lane.	Outcome of the CEA will be greatest when the greatest number of other schemes, present or planned, are considered.

### 3.13 Cumulative Effect Assessment

3.13.1.1 A description of the significance of cumulative effects upon ecology and nature conservation receptors arising from each identified impact is given below.

#### 3.13.2 Construction phase

**Cumulative potential for open cut trenching and installation of cables leading to habitat loss and/or severance for a number of species.**

##### *Tier 1*

3.13.2.1 Tier 1 developments will result in permanent habitat loss and construction of these developments could also give rise to disturbance impacts which have potential to result in greater disturbance to species if construction overlaps with cable installation.

3.13.2.2 There are three locations in particular where residential developments are proposed close to the cable corridor.

3.13.2.3 These are:

- Easton (developments 20170052 and 2014/2611);
- Little Melton (developments 2013/0092, 2013/0086, 2015/2630, 2012/1836 and 2015/1697); and
- Hethersett (developments 2015/1594 and 2015/1681).

3.13.2.4 Surveys to determine presence/absence of protected and other species in the vicinity of these developments are being undertaken currently. Until the survey results are known, assessing cumulative impacts on the majority of species considered likely to be present is not possible.

3.13.2.5 A full assessment of effects on species will be undertaken once surveys are completed (autumn 2017), and will be reported in the Environmental Statement following stakeholder consultation with the EWG. The consultation exercise will include consultation on the mitigation measures required to address any significant effects identified.

3.13.2.6 Cumulative disturbance effects would only occur in the event that construction of some or all of these developments occurs at the same time as cabling works. If this happens, displacement of mobile species such as breeding or wintering birds could take place across a wider area than would be the case for the cabling works in isolation.

3.13.2.7 Impacts of habitat loss would be temporary (but intermittent) given that the cable corridor habitats would be restored.

##### *Tier 2*

3.13.2.8 The Norfolk Vanguard onshore cable route is the only Tier 2 development with potential for cumulative impacts with Hornsea Three and therefore, has been considered within the CEA. The Norfolk Vanguard cable route crosses Hornsea Three north of Reepham, and the two cable routes are roughly perpendicular.

3.13.2.9 The potential for cumulative impact includes effects of temporary disturbance in the event that the two cabling operations coincide. The Norfolk Vanguard application is expected to be submitted to the Planning Inspectorate in 2018. Assuming a similar timescale for the application to proceed through the planning system as for Hornsea Three, it is possible that cabling works for both projects could be undertaken in the same approximate timescale, especially considering the maximum design scenario for Hornsea Three of a three-phase cabling operation over an 11 year period.

3.13.2.10 Discussions with the Norfolk Vanguard project are ongoing in order to understand the likely interactions of the two projects. For logistical reasons, some co-ordination of the two schemes would be desirable to avoid conflict during construction. Discussions on sections of cross-over between the two schemes has commenced and are ongoing. It is therefore assumed that cabling works for both schemes taking place at the same time at the location where the routes cross would be unlikely.

3.13.2.11 A further cumulative impact could arise for species such as bats, as the two cable corridors will result in severance of hedgerows in both north-south and east-west directions. There could therefore be a greater fragmentation effect for bat species that prefer to commute along linear features such as hedgerows.

3.13.2.12 Surveys are ongoing to determine whether the area in the vicinity of the cable corridor crossing point is of high value to bats. If surveys do demonstrate that the area is of importance, mitigation options include use of artificial hedgerows to close gaps along hedgerows of high value between cabling phases and while replacement planting matures. The option of HDD under hedges of very high value could also be considered as a way of reducing the cumulative effect of the two cable routes at the point where they cross.

3.13.2.13 A full assessment of the cumulative impact of Hornsea Three and Norfolk Vanguard on species will be undertaken once the surveys have been completed.

##### *Future monitoring*

3.13.2.14 The requirement for future monitoring will be determined following the completion of surveys and full impact assessment.

### 3.13.3 Operation and maintenance phase

**Potential for operation to result in low-level visual disturbance, and noise and vibration disturbance of habitats and wildlife during routine maintenance operations.**

#### *Tier 1 and 2*

- 3.13.3.1 Regular inspections of the onshore cable, approximately every two to five years, will be undertaken via the link boxes. Should repairs to the cable become necessary; the cable will be accessed at the relevant jointing pits and pulled between them. Jointing bays will remain in place during operation. Access to the link boxes, jointing pits and transition joint bays will be via existing roads, tracks and field gates, with the permission of the landowner. These visits will be made by light vehicles only. In the unlikely event that a larger vehicle is required to access the jointing pits or transition bays, and existing roads and tracks do not allow suitable access, a temporary metal track (or similar) would be constructed to gain access. Any possible impacts would be kept to a minimum.
- 3.13.3.2 Any activity is likely to be undertaken during daylight hours. Lighting will be limited to that required for maintenance only and to light pathways for health and safety purposes. No night time lighting is likely to be required on a routine basis and therefore, operational maintenance is not likely to cause significant disturbance to crepuscular or nocturnal species.
- 3.13.3.3 No new significant damage or disruption to existing or reinstated habitats is anticipated during this period.
- 3.13.3.4 The potential for cumulative disturbance effects on species would therefore be restricted to overlap between maintenance inspections and construction of Tier 1 or 2 developments, along the parts of the route close to construction sites.

#### Magnitude of impact

- 3.13.3.5 The impact is predicted to be of local / spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptors directly. The magnitude is therefore, considered to be **negligible**.

#### Sensitivity of receptor

- 3.13.3.6 The sensitivities of individual receptors are described under the impacts of construction (section 3.13.2 above).
- 3.13.3.7 Designated sites and habitats of conservation importance along the route and in the surrounding area are of up to very high vulnerability, low recoverability, and international value. Sensitivities vary from low to very high.

- 3.13.3.8 Sensitivity of populations of the majority of protected species in the area potentially affected by cumulative disturbance effects are yet to be determined but are likely to be of various levels of sensitivity; up to moderate vulnerability, low recoverability and up to national value. Sensitivities are likely to vary from **low to high**.

#### Significance of the effects

- 3.13.3.9 Overall, it is predicted that the sensitivity of the receptor is considered to be up to **high** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

#### *Future monitoring*

- 3.13.3.10 Given the negligible significance of cumulative effects assessed for the operational phase, ecological monitoring of these effects during operation is not considered to be required.

### 3.13.4 Decommissioning phase

**Potential for decommissioning of cables to affect species.**

- 3.13.4.1 Decommissioning of cables has the potential to affect species, primarily through disturbance but potentially also through temporary habitat loss from construction of access tracks for vehicular access to jointing pits and link boxes.
- 3.13.4.2 A CoCP will be produced to summarise measures to be taken to minimise impacts prior to the commencement of works.
- 3.13.4.3 Overall, impacts from cable decommissioning would be considerably lower than impacts from cable construction.
- 3.13.4.4 Given the lifetime of the project it is considered unlikely that the construction phase of the Tier 1 or Tier 2 developments listed in Table 3.17 would overlap with the decommissioning of Hornsea Three.

#### Magnitude of impact

- 3.13.4.5 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

#### Sensitivity of receptor

- 3.13.4.6 Species are deemed to be of up to high vulnerability, low recoverability and up to national value. The sensitivity of the receptor is therefore, considered to be up to **high**.

#### Significance of the effects

- 3.13.4.7 Overall, it is predicted that the sensitivity of the receptor is considered to be up to **high** and the magnitude is deemed to be **minor**. The effect will, therefore, be of up to **minor adverse** significance, which is not significant in EIA terms.

#### *Future monitoring*

- 3.13.4.8 Requirements for future monitoring would be determined by results of pre-commencement ecology surveys and formalised via the production of a CoCP.

### 3.14 Transboundary effects

- 3.14.1.1 A screening of transboundary impacts has been carried out and is presented in volume 6, annex 5.5: Transboundary Impacts Screening Note. This screening exercise identified that there was no potential for significant transboundary effects with regard to onshore ecology and nature conservation from Hornsea Three upon the interests of other EEA States.

### 3.15 Inter-related effects

- 3.15.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. These are considered to be:
- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the project (construction, operational and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. subsea noise effects from piling, operational turbines, vessels and decommissioning).
  - Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on chapter topic, such as direct habitat loss or disturbance, sediment plumes, scour, jack-up vessel use etc., may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.
- 3.15.1.2 A description of the likely inter-related effects arising from Hornsea Three on ecology and nature conservation is provided in volume 3, chapter 11: Inter-Related Effects (Onshore).

### 3.16 Conclusion and summary

- 3.16.1.1 Based on the assessment of the PEIR boundary, the development of onshore infrastructure for Hornsea Three could result in some impact on sites designated due to their ecology and nature conservation value, and will affect a number of habitats, wintering and migratory birds, badgers, and other species to be determined following completion of surveys carried out in 2017 (Table 3.19). The ECR corridor will be refined ahead of the final DCO application, and effects minimised by final route selection and other mitigation measures to be reported at the Environmental Assessment stage.
- 3.16.1.2 Under the maximum design scenario of cable installation via open cut in a three phase construction period lasting 11 years, impacts on designated sites assessed within the PEIR would be up to major adverse if final route selection and construction method involves open trenching through designated sites. Effects of habitat loss would be medium – long term given the time period between the first and last phase of cabling under this scenario before permanent restoration can commence. In the case of some designated sites, such as Kelling Heath SSSI and sites designated for woodland, effective restoration in this scenario is either unlikely, or, in the case of woodland sites where deep-rooted trees cannot be planted over the cable route, not possible. The maximum design scenario for PEIR therefore potentially results in several impacts on designated sites and habitats that are significant in EIA terms.
- 3.16.1.3 However, impacts of habitat loss on designated sites can be avoided or minimised by ensuring that final route selection at final Environmental Statement stage avoids direct land take or through consideration of other mitigation measures. In most cases this can be accomplished by positioning the final 80 m cable corridor outside of designated sites that fall within the onshore cable corridor search area.
- 3.16.1.4 In cases where avoiding designated sites is not possible (i.e. where the designated site crosses the complete Ecology and nature conservation study area such as River Wensum SAC/SSSI, Kelling Heath SSSI/Kelling Heath Park and 100 Acre Wood CWS, Land Adjoining River Tud CWS and Low Common CWS), trenchless techniques can be employed to avoid direct habitat loss.
- 3.16.1.5 It is therefore possible to reduce all significant effects to negligible with appropriate selection of route and / or construction methods.
- 3.16.1.6 Trenchless techniques will be employed under major watercourses and potentially in other sensitive locations to be determined following completion of species surveys.

- 3.16.1.7 A significant amount of hedgerow (extent to be quantified at final route selection stage) will need to be removed to facilitate cable installation. As the maximum design scenario involves a three phase installation over an 11 year period, it could potentially take around 15-19 years from the date of first clearance before replacement hedgerow planting would mature. This is unavoidable unless cabling can be installed in different locations within the PEIR boundary for each phase given that there is no benefit from replanting in between cabling phases if replanted hedgerows would need to be removed for subsequent phases. Installing cables in different locations would reduce the time required for replacement planting to mature but would also result in the loss of a greater length of hedgerow, which could also have greater impacts on species such as bats.
- 3.16.1.8 The long-term impact once hedgerow planting has matured should be no net loss of hedgerow habitat, but there may be a significant adverse impact in the medium-long term.
- 3.16.1.9 Impacts on designated sites and habitats from construction (e.g. dust generation, run-off pollution) will be controlled via the adoption of standard best practice working measures to be set out in the CoCP.
- 3.16.1.10 Impacts on species have yet to be determined with a few exceptions. There is potential for a significant disturbance effect on pink-footed goose at the north end of the cable route, where a significant percentage of the North Norfolk Coast SPA population has been recorded using sugar beet fields within or adjacent to the cable route around Weybourne. Options for reducing the significance of this impact include, where practicable with the construction programme, avoidance of sensitive periods for construction, and use of habitat manipulation to encourage the birds to settle on land outside the likely disturbance zone. These options will be explored and discussed via the EWG prior to the final DCO application.
- 3.16.1.11 Direct impacts of permanent habitat loss for construction of the HVAC booster station and onshore HVDC converter/HVAC substation and temporary loss for construction compounds are not considered to be significant in EIA terms. Additional habitat loss will be required for construction of haul routes; again, impacts would not be significant provided that sensitive habitats such as woodland are avoided.
- 3.16.1.12 Operational phase impacts are not considered to be significant in EIA terms.
- 3.16.1.13 There is some potential for cumulative effects with the Norfolk Vanguard onshore cable route. Discussions with the Norfolk Vanguard project are ongoing in order to understand the likely interactions of the two projects. For logistical reasons, some co-ordination of the two schemes would be desirable to avoid conflict during construction. Discussions on sections of cross-over between the two schemes has commenced and are ongoing. It is therefore assumed that cabling works for both schemes taking place at the same time at the location where the routes cross would be unlikely.
- 3.16.1.14 Taking into account mitigation measures adopted as part of Hornsea Three and additional measures to be adopted where necessary, it is considered that for most features of ecology and nature conservation interest, the overall significance of effects that are able to be assessed at this stage of the survey and assessment process will be no greater than minor adverse, which is not significant in EIA terms, conditional upon appropriate route and construction method selection to avoid or minimise direct habitat loss effects from cable installation in designated sites.
- ### 3.17 Next Steps
- 3.17.1.1 Hydrological characterisation of the proposed crossing locations of the EA designated main rivers is currently underway. The work comprises a desk study and site walkover to identify the hydrological and ecological features in these locations and how they interact. Potential constraints will be mapped and which will be used to inform the design of the crossing methodologies in these areas. The hydrological characterisation work will be reported in the Final Environmental Statement, following consultation with the EWG on outputs once complete.
- 3.17.1.2 Survey information on a range of species is being collected in 2017. A full assessment of effects on species will be undertaken once surveys are completed (autumn 2017), and will be reported in the Environmental Statement, following stakeholder consultation via the EWG. The consultation exercise will include consultation on the mitigation measures required to address any significant effects identified.
- 3.17.1.3 The results of the surveys will also inform final route selection and other elements of the scheme design which are currently ongoing and which will be consulted on via the EWG and reported in the Environmental Statement.
- 3.17.1.4 The ecological mitigation measures will form part of the Code of Construction Practice and Outline Ecological Management Plan that will accompany the Final Environmental Statement. Hornsea Three will develop these Plans in consultation with key stakeholders via the EWG, having regard to feedback received to date and through the upcoming PEIR process, and beyond.
- 3.17.1.5 As noted as part of the assessment, it is possible in many of cases to avoid impacts within designated sites by ensuring that the final 80m cable corridor in the construction phase avoids designated sites that fall within the Ecology and nature conservation study area, or by employing trenchless techniques.
- 3.17.1.6 Given that impact avoidance via cable route selection and / or trenchless techniques is the most effective way of avoiding or reducing impacts, an assessment of effect significance setting out how significance would reduce if these options can be committed to at Final Environmental Statement stage has also been provided Table 3.16.

3.17.1.7 Hornsea Three will have regard to ecology and nature conservation as the onshore cable corridor refinement process continues. Where it is possible to avoid direct interaction with sensitive and/or designated sites through the route refinement process these opportunities will be given consideration. Hornsea Three will continue to consult with key stakeholders both directly and through the onshore ecology EWG. Progress on route refinement work will be reported regularly.

Table 3.19: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
<i>Construction Phase</i>							
Potential for open cut trenching and installation of cables to cause habitat loss in Norfolk Valley Fens SAC.	Maximum design scenario of open cut cable installation through designated sites. Citing of HDD pits and cable route outside designated site boundary.	Minor	Very high	Moderate	Citing of HDD pits and cable route outside designated site boundary.	Negligible	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Very high	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Booton Common SSSI.	Maximum design scenario of open cut cable installation through designated sites	Moderate	High	Moderate	Citing of HDD pits and cable route outside designated site boundary.	Negligible	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in River Wensum SAC/SSSI	Maximum design scenario of open cut cable installation through designated sites. HDD under watercourse to avoid direct habitat loss.	Minor	High	Moderate	HDD under watercourse to avoid direct habitat loss.	Negligible	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Kelling Heath SSSI.	Maximum design scenario of open cut cable installation through designated sites	Major	High	Major	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Alderford Common SSSI.	Maximum design scenario of open cut cable installation through designated sites	Major	High	Major	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Beach Lane,	Maximum design scenario of open cut cable installation through designated sites	Major	High	Major	N/A	N/A	Monitoring during construction by ECoW

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Weybourne CWS.	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Kelling Heath Park & 100 Acre Wood CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Dismantled Railway CWS.	Maximum design scenario of open cut cable installation through designated sites	Moderate	Low	Minor	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Marriott's Way CWS.	Maximum design scenario of open cut cable installation through designated sites	Minor	Low	Minor	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Bush Meadow Plantation CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Harman's Grove CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Land adjoining River Tud CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Old Hall Meadow CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Major	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for open cut trenching and installation of cables to cause habitat loss in Yare Valley (Marlingford) CWS.	Maximum design scenario of open cut cable installation through designated sites	Minor	Low	Minor	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Low	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Low Common CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	High	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	High	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss in Foxburrow Meadow CWS.	Maximum design scenario of open cut cable installation through designated sites	Major	Medium	Moderate	N/A	N/A	Monitoring during construction by ECoW
	Final selection of cable route to avoid designated sites where practicable or employ trenchless techniques.	No change	Medium	Negligible	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause loss of hedgerow habitat	Replacement planting with a native mix of species.	Moderate	Medium	Moderate	Once the replacement planting has matured, the impact on the hedgerow habitat will be negligible as so significant long-term net loss of hedgerow habitat will occur.	Negligible	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause loss, damage to and disturbance of watercourses	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Medium	Minor	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause loss, damage to and disturbance of ponds	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Medium	Minor	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause damage to designated sites from airborne pollutants	Final selection of cable route to avoid designated sites where practicable	Negligible	Very high	Minor	N/A	N/A	N/A
Potential for open cut trenching and installation of cables to cause damage to habitats from airborne pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Negligible	High	Minor	N/A	N/A	N/A
Potential for open cut trenching and installation of cables to cause damage to designated sites from run-off pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Very high	Moderate	Final selection of cable route to avoid designated sites where practicable.	Minor	Monitoring during construction by ECoW

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for open cut trenching and installation of cables to cause damage to habitats from run-off pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Negligible	High	Minor	N/A	N/A	N/A
Potential for open cut trenching and installation of cables leading to habitat loss and/or severance for a number of species: <ul style="list-style-type: none"> <li>• White clawed crayfish;</li> <li>• Desmoulin's Whorl Snail;</li> <li>• GCN;</li> <li>• Reptiles;</li> <li>• Breeding birds;</li> <li>• Bats;</li> <li>• Water voles; and</li> <li>• Otters.</li> </ul>	Survey methods will incorporate standard best practice guidance (see Section 3.7.4)	To be determined	N/A	N/A	N/A	N/A	To be determined
Potential for open cut trenching and installation of cables to cause habitat loss and disturbance to badgers	Survey methods will incorporate standard best practice guidance	Minor	Low	Minor	N/A	N/A	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause disturbance to birds that are designated features of the North Norfolk Coast SPA/Ramsar	Survey methods will incorporate standard best practice guidance	Moderate	High	Major	Options to reduce impacts will be explored prior to final DCO application, and include timing works around sensitive periods, where practicable, and use of habitat manipulation to encourage birds to settle on fields outside the zone affected by construction disturbance	Minor	Monitoring during construction by ECoW
Potential for open cut trenching and installation of cables to cause habitat loss and disturbance to other wintering birds	Survey methods will incorporate standard best practice guidance	Minor	Low	Minor	N/A	N/A	N/A
Potential for permanent habitat loss from construction of onshore infrastructure have adverse impacts on habitats		Minor	Low	Minor	N/A	N/A	N/A
Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on species	Survey methods will incorporate standard best practice guidance	To be determined	N/A	N/A	N/A	N/A	N/A

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for permanent habitat loss from construction of onshore infrastructure to have adverse impacts on wintering birds	Survey methods will incorporate standard best practice guidance	Minor	Low	Minor	N/A	N/A	N/A
Potential for trenchless duct installation and cable pulling beneath watercourses to cause damage and disturbance to designated sites	Final selection of cable route to avoid designated sites where practicable	Minor	High	Minor	N/A	N/A	N/A
Potential for trenchless duct installation and cable pulling beneath watercourses to cause damage and disturbance to other watercourses and habitats	Selection of appropriate locations for trenchless installation	Minor	Medium	Minor	N/A	N/A	N/A
Potential for trenchless duct installation and cable pulling beneath watercourses to cause habitat loss and disturbance to protected species	Survey methods will incorporate standard best practice guidance	To be determined	N/A	N/A	N/A	N/A	N/A
Potential for construction of onshore infrastructure to have adverse impacts on designated sites from airborne pollutants	Final selection of cable route to avoid designated sites where practicable Measures to minimise and control pollutants during construction (see Table 3.14)	Negligible	Medium	Minor	N/A	N/A	N/A
Potential for construction of onshore infrastructure to cause damage to designated sites from run-off pollutants	Final selection of cable route to avoid designated sites where practicable Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Medium	Minor	N/A	N/A	N/A
Potential for construction of onshore infrastructure to have adverse impacts on habitats from airborne pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for construction of onshore infrastructure to cause damage to habitats from run-off pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for temporary habitat loss from construction of temporary works compounds to have adverse impacts on habitats		Minor	Low	Minor	N/A	N/A	N/A
Potential for construction of temporary works compounds to have adverse impacts on designated sites from airborne pollutants	Final selection of cable route to avoid designated sites where practicable	Negligible	Medium	Minor	N/A	N/A	N/A

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for construction of temporary compounds to cause damage to designated sites from run-off pollutants	Final selection of cable route to avoid designated sites where practicable Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Medium	Minor	N/A	N/A	N/A
Potential for construction of works compounds to have adverse impacts on habitats from airborne pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for construction of temporary compounds to cause damage to habitats from run-off pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for temporary habitat loss from construction of works compounds to have adverse impacts on species	Survey methods will incorporate standard best practice guidance	To be determined	N/A	N/A	N/A	N/A	N/A
Potential for temporary habitat loss from construction of works compounds to have adverse impacts on wintering birds	Survey methods will incorporate standard best practice guidance	Minor	Low	Minor	N/A	N/A	N/A
Potential for temporary habitat loss from construction of access tracks to have adverse impacts on designated sites <ul style="list-style-type: none"> <li>Dismantled Railway CWS</li> <li>Marriot's Way CWS (two locations)</li> <li>Low Common CWS.</li> </ul>	Final selection of cable route to avoid designated sites where practicable	Minor (Dismantled Railway and Marriot's Way) Moderate (Low Common)	Medium	Minor (Dismantled Railway and Marriot's Way)  Moderate (Low Common)	Restoration of habitats after each cabling phase	Negligible (Dismantled Railway and Marriot's Way)  Minor (Low Common)	Monitoring during construction by ECoW
Potential for temporary habitat loss from construction of access tracks to have adverse impacts on habitats	N/A	Minor	Low	Low	N/A	N/A	N/A
Potential for construction and use of access tracks to have adverse impacts on designated sites from airborne pollutants	Final selection of cable route to avoid designated sites where practicable Measures to minimise and control pollutants during construction (see Table 3.14)	Negligible	High	Minor	N/A	N/A	N/A
Potential for construction and use of access tracks to cause damage to designated sites from run-off pollutants	Final selection of cable route to avoid designated sites where practicable	Minor	High	Minor	N/A	N/A	N/A

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for construction and use of access tracks to have adverse impacts on habitats from airborne pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for construction and use of access tracks to cause damage to habitats from run-off pollutants	Measures to minimise and control pollutants during construction (see Table 3.14)	Minor	Low	Minor	N/A	N/A	N/A
Potential for temporary habitat loss from construction of access tracks to have adverse impacts on species	Survey methods will incorporate standard best practice guidance	To be determined	N/A	N/A	N/A	N/A	Monitoring during construction by ECoW
Potential for temporary habitat loss and disturbance from construction and use of access tracks to have adverse impacts on wintering pink-footed goose	Survey methods will incorporate standard best practice guidance	Moderate	High	Major	Options to reduce impacts will be explored prior to final DCO application, and include timing works around sensitive periods, where practicable, and use of habitat manipulation to encourage birds to settle on fields outside the zone affected by construction disturbance	Minor	Monitoring during construction by ECoW
Potential for temporary habitat loss and disturbance from construction and use of access tracks to have adverse impacts on wintering birds	Survey methods will incorporate standard best practice guidance	Minor	Low	Minor	N/A	N/A	Monitoring during construction by ECoW
<b>Operation Phase</b>							
Potential for operation to result in low-level visual disturbance, and noise and vibration disturbance of habitats and species during routine maintenance operations	Operational phase measures shown in Table 3.14	Negligible	Low to very high	Negligible to minor	N/A	N/A	Requirements for future monitoring would be determined by results of pre-commencement ecology surveys and formalised via the production of a CoCP.
Potential for operation to result in potential contamination of habitats and watercourses through accidental spillage of chemicals or fuels during routine maintenance operations, and/or increased sedimentation as a result of physical disturbance of soils	Operational phase measures shown in Table 3.14	Negligible	Medium	Negligible	N/A	N/A	N/A
<b>Decommissioning Phase</b>							
Potential for decommissioning of cables to affect designated sites	Measures to be adopted during decommissioning will be similar to those adopted during construction	Negligible	High	Minor	N/A	N/A	N/A

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Potential for decommissioning of cables to affect habitats	Measures to be adopted during decommissioning will be similar to those adopted during construction	Negligible	Medium	Minor	N/A	N/A	N/A
Potential for decommissioning of cables to affect species	Measures to be adopted during decommissioning will be similar to those adopted during construction	Minor	High	Moderate	Pre-commencement surveys to update information on the distribution of species would be carried out, and appropriate mitigation adopted where necessary.	Negligible	Requirements for future monitoring would be determined by results of pre-commencement ecology surveys and formalised via the production of a CoCP.
Potential for decommissioning of HVAC booster station and onshore HVDC converter/HVAC substation to affect designated sites	Measures to be adopted during decommissioning will be similar to those adopted during construction	Negligible	Medium	Minor	N/A	N/A	N/A
Potential for decommissioning of HVAC booster station and onshore HVDC converter/HVAC substation to affect habitats	Measures to be adopted during decommissioning will be similar to those adopted during construction	Negligible	Medium	Minor	N/A	N/A	N/A
Potential for decommissioning of onshore HVDC converter/HVAC substation and HVAC booster station to affect species	Measures to be adopted during decommissioning will be similar to those adopted during construction	To be determined	N/A	N/A	N/A	N/A	Requirements for future monitoring would be determined by results of pre-commencement ecology surveys and formalised via the production of a CoCP.

### 3.18 References

- Agate, E. (2002) Hedging, A Practical Handbook. British Trust for Conservation Volunteers.
- Baagøe, H.J. (1999) *Vespertilio murinus* Linnaeus, 1758. In: Mitchell-Jones A.J. et al. (eds) The Atlas of European Mammals. Academic Press, London, pp. 144–145.
- Baillie, S.R., Marchant, J.H., Leech, D.I., Renwick, A.R., Joys, A.C., Noble, D.G., Barimore, C., Conway, G.J., Downie, I.S., Risely, K. and Robinson, R.A. (2010). Breeding Birds in the Wider Countryside: their conservation status 2010. BTO Research Report No. 565. Thetford, British Trust for Ornithology.
- Baker, H., Stroud, D.A., Aebischer, N.J., Cranswick, P.A., Gregory, R.D., McSorley, C.A., Noble, D.G. and Rehfisch, M.M. (2006). Population estimates of birds in Great Britain and the United Kingdom. *British Birds*, 25(99), 25–44.
- Bang, P. and Dahlstrøm, P. (2001) Animal tracks and Signs. Oxford University Press, Oxford.
- Bat Conservation Trust (2007) Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London.
- Bat Conservation Trust (2010) Bat Conservation Trust Nathusius' pipistrelle factsheet. Bat Conservation Trust, London.
- Bat Conservation Trust (2012) Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London.
- Biodiversity Steering Group. (1995) Biodiversity: The UK Steering Group Report. HMSO, London. Burfield, I. and van Bommel, F. (2004) Birds in Europe: population estimates, trends and conservation status. Birdlife International, Cambridge.
- Chanin, P. (2003) Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10. Peterborough, English Nature.
- Cheffings, C.M. and Farrell, L. (eds.), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J. and Taylor, I. (2005) The Vascular Plant Red Data List for Great Britain. Species Status 7, 1-116. Peterborough, Joint Nature Conservation Committee.
- Conservation of Habitats and Species Regulations 2010. 2010 SI 2010/490. London, The Stationary Office.
- Council Decision 82/72/EEC of 3 December 1981 concerning the conclusion of the Convention on the conservation of European wildlife and natural habitats.
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
- Department for Energy and Climate Change (2011c) Electricity Networks Infrastructure (EN-5). London, The Stationery Office. Department for Environment, Food and Rural Affairs (2002). Multi-Agency Geographic Information for the Countryside. [Online]. Available at: <http://magic.defra.gov.uk>. (accessed: 31/05/2012).
- Department for Environment, Food and Rural Affairs (2007a) Conserving Biodiversity – The UK Approach. London, Department for Environment, Food and Rural Affairs.
- Department for Environment, Food and Rural Affairs (2007b) Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. London, Department for Environment, Food and Rural Affairs.
- Department of Energy and Climate Change (2011a) Overarching National Policy Statement for Energy (EN-1). London, The Stationery Office.
- Department of Energy and Climate Change (2011b) National Policy Statement for Renewable Energy Infrastructure (EN-3). London, The Stationery Office.
- Dietz, C., von Helverson, O., and Dietmar, N. (2009) Bats of Britain, Europe and North-west Africa. London, A&C Black.
- Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds.
- Eaton, M.A., Brown, A.F., Noble, D.G., Musgrove, A.J., Hearn, R., Aebischer, N.J., Gibbons, D.W., Evans, A. and Gregory, R.D. (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds*, 102, 296-341.
- Edgar, P., Foster, J. and Baker, J. (2010) Reptile Habitat Management Handbook. Bournemouth, Amphibian and Reptile Conservation.
- English Nature (2001) Great Crested Newt Mitigation Guidelines. York, English Nature. Gilbert, G., Gibbons, D.W. and Evans, J. (1998) Bird Monitoring Methods—a manual of techniques for key UK species. Sandy, Royal Society for the Protection of Birds.
- Gill, J.A, Watkinson, A.R. & Sutherland, W.J. (1996). The impact of sugar beet farming practice on wintering pink-footed goose *Anser brachyrhynchus* populations. *Biological Conservation*, 76, 95-100.
- Hagemeyer, W.J.M., Blair, M. (eds.) (1997) The EBCC Atlas of European Breeding Birds: Their Distribution and Abundance. London, T and AD Poyser.
- Herpetofauna Groups of Britain and Ireland (1998) Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards. HGBI Advisory Note for Amphibian and Reptile Groups. Herpetofauna Groups of Britain and Ireland.
- HM Government (1994) Biodiversity: the UK Action Plan. HMSO, London.
- Hundt, L. (2012). Bat surveys. 2nd ed. London: Bat Conservation Trust.
- Institute of Ecology and Environmental Management (2006) Guidelines for Ecological Impact Assessment in the United Kingdom. Version 7 [Online]. Available at: <http://www.ieem.org.uk/ecia/index.html>.
- Inter-Agency Climate Change Forum (2010). Biodiversity and Climate Change in the UK. Peterborough, JNCC.

Jenkins, G.J., Perry, M.C. & Prior, M.J. (2008). The climate of the United Kingdom and recent trends. Met Office Hadley Centre, Exeter. (2009 revised edition).

Joint Nature Conservation Committee (2010) Handbook for Phase 1 habitat survey - a technique for environmental audit. Peterborough, Joint Nature Conservation Committee.

Joint Nature Conservation Committee (2011) UK Biodiversity Action Plan. [Online]. Available at: <http://jncc.defra.gov.uk/page-5155>.

Marchant, J.H. (1983) BTO Common Birds Census Instructions. Thetford, British Trust for Ornithology.

Mitchell-Jones, A.J. (2004) Bat Mitigation Guidelines. English Nature.

Natural England (2010). *Badger and Development: A Guide to Best Practise and Licensing*. Bristol, Natural England.

Natural Environment and Rural Communities Act 2006. London, The Stationary Office.

Neal, E. and Cheeseman, C. (1996) Badgers. London, Poyser Natural History.

Office of the Deputy Prime Minister (2005) Planning Policy Statement 9: Biodiversity and Geological Conservation. London, The Stationery Office.

Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10 (4), 143-155.

RPSB (2008). *Farming for wildlife: Pink-footed Goose*. RPSP, Sandy.

SMart Wind Limited (2010) Scoping report for Project One. London, SMart Wind Limited.

SMart Wind Limited (2012) Hornsea Project One Addendum to Environmental Impact Assessment Scoping Report. London, SMart Wind Limited.

Strachan, R. and Moorhouse, T. (2011) The Water Vole Conservation Handbook. Third Edition. Oxford, WildCRu.

The Hedgerow Regulations 1997. 1997 SI 1997/1160. London, The Stationary Office.

The Planning Inspectorate (2012) Advice Note Nine - Rochdale Envelope. Bristol, The Planning Inspectorate.

The Planning Inspectorate (2012). Hornsea Project One Second Scoping Opinion. Bristol, The Planning Inspectorate.

The Planning Inspectorate (2016) Advice Note Ten: Habitats Regulations Assessment Relevant to Nationally Significant Infrastructure Projects. [Online]. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/09/Advice-note-10-HRA.pdf>.

Wildlife and Countryside Act 1981. London, The Stationary Office.

Wray S., Wells D., Long E., Mitchell-Jones A., M. (2010) Valuing Bats in Ecological Impact Assessment. *Institute of Ecology and Environmental Management In-Practice*, 23-25.

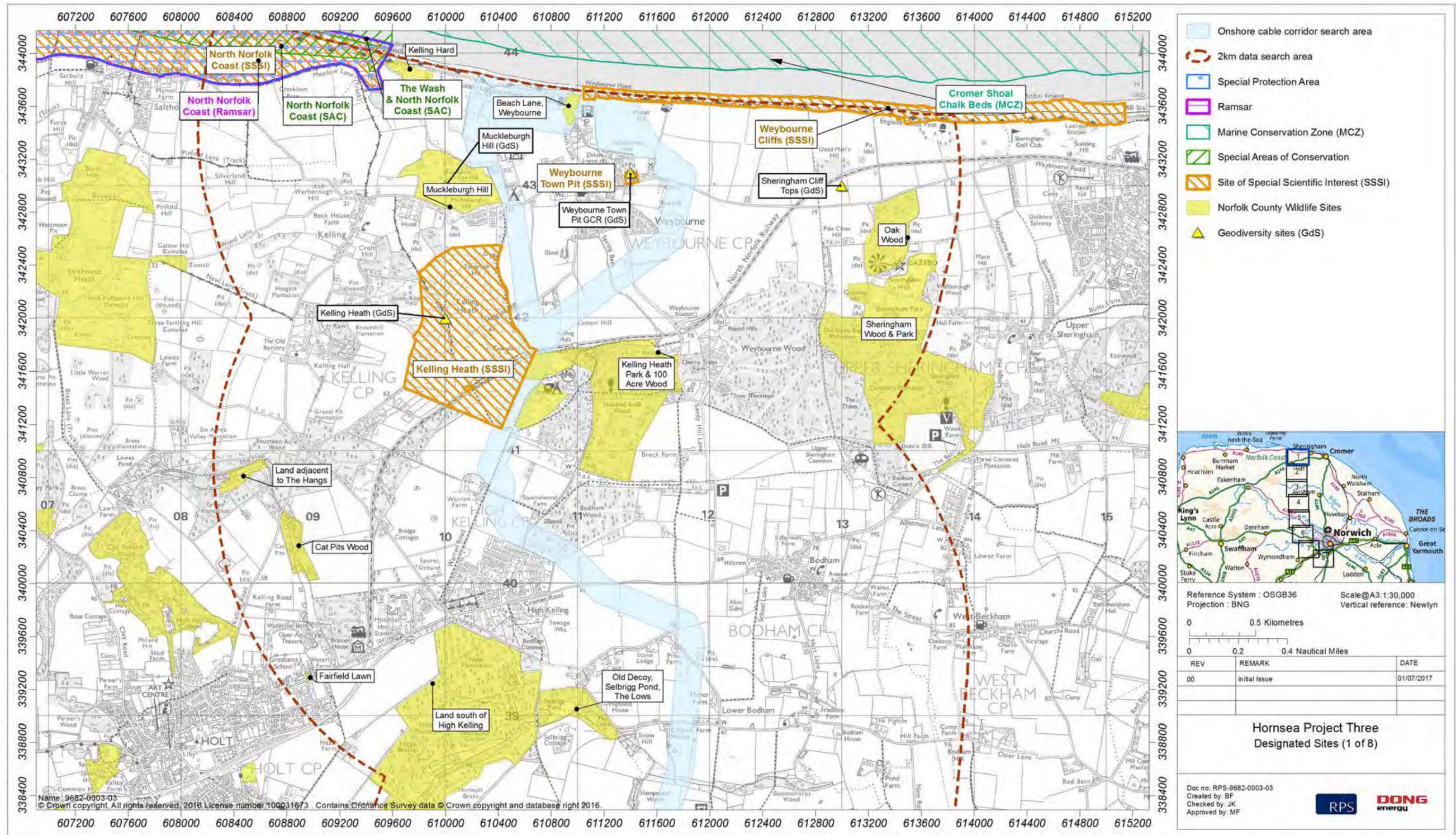


Figure 3.2: Location of designated sites.

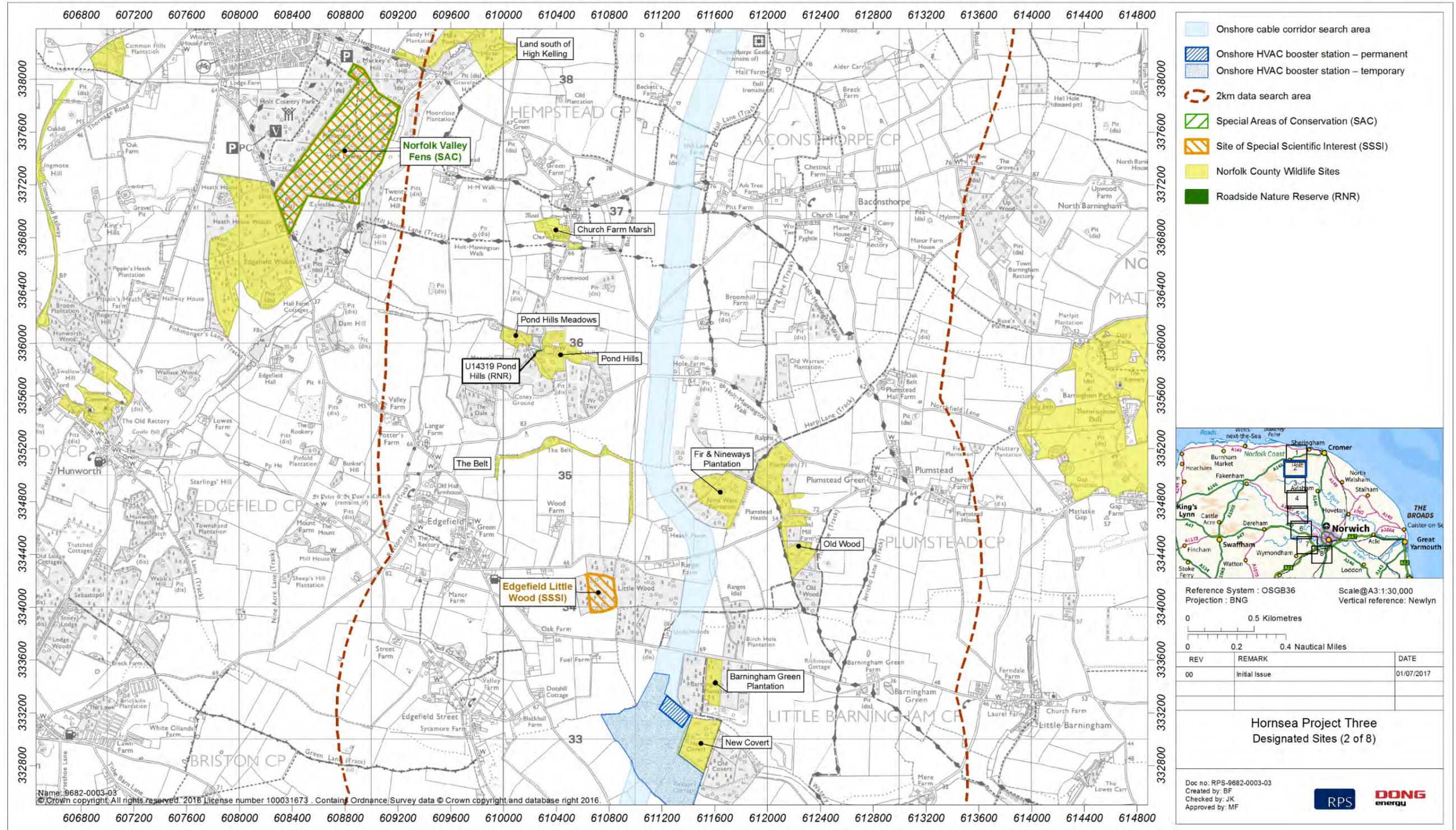


Figure 3.2: Location of designated sites.

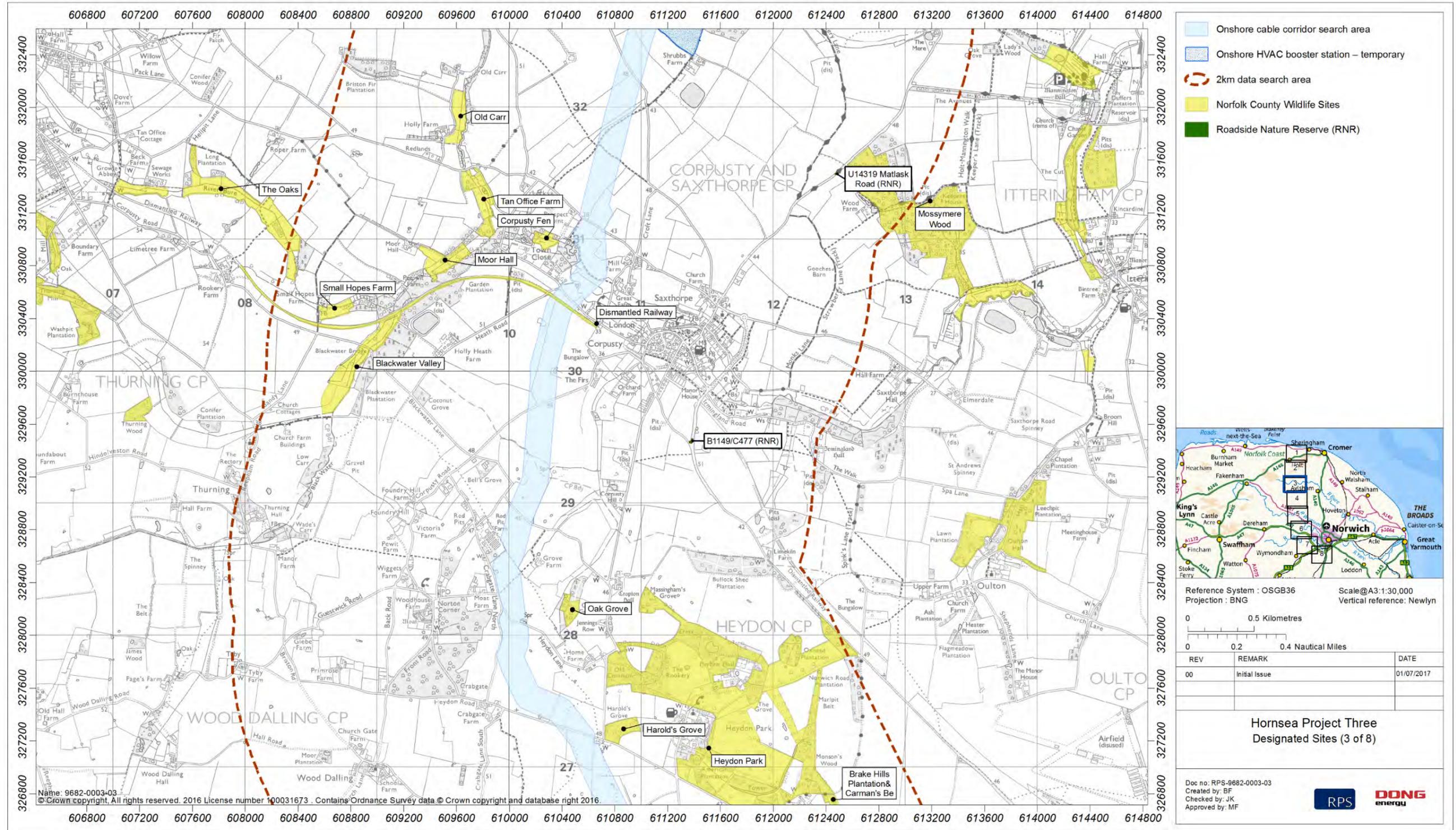


Figure 3.2: Location of designated sites.

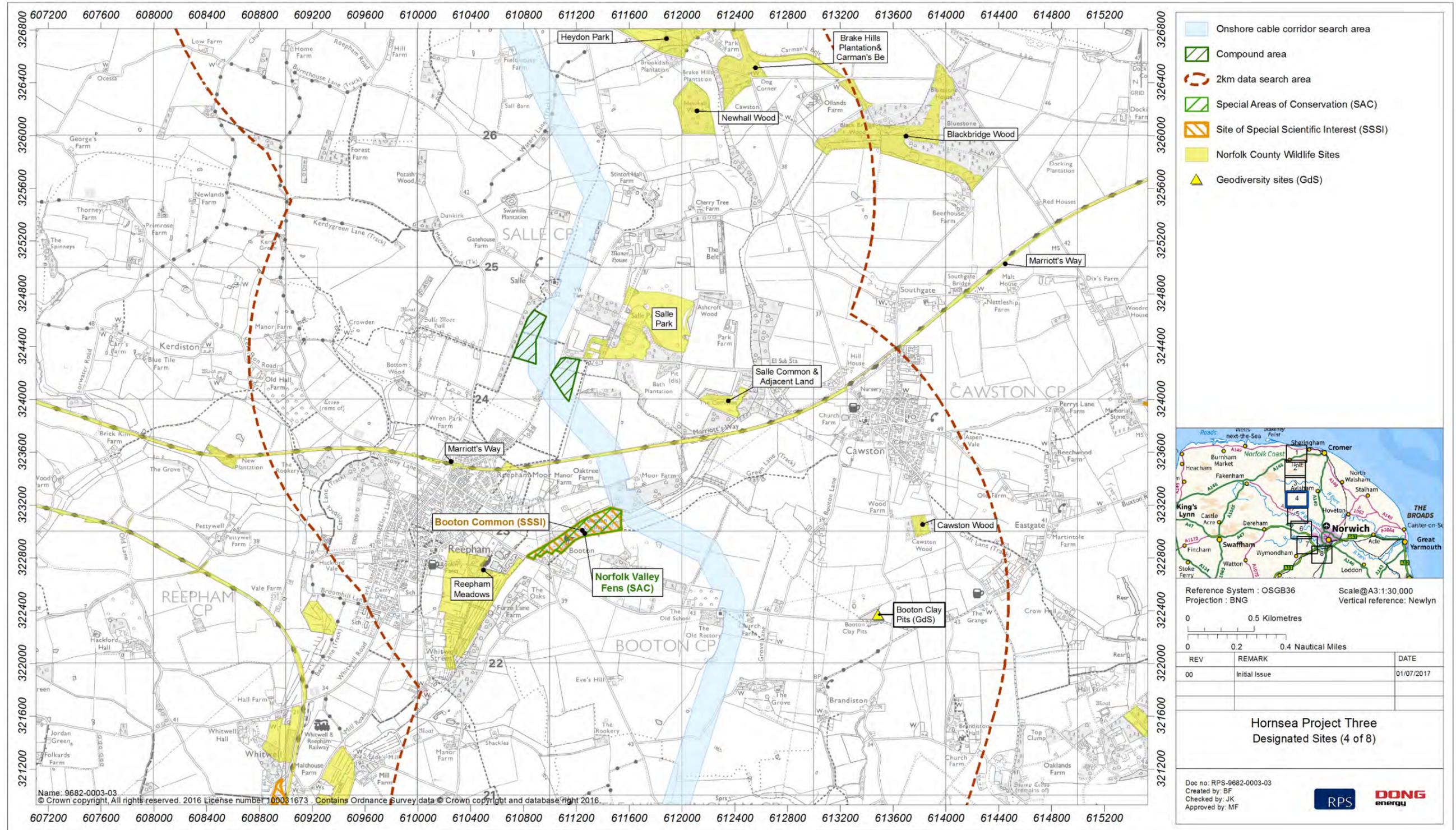


Figure 3.2: Location of designated sites.

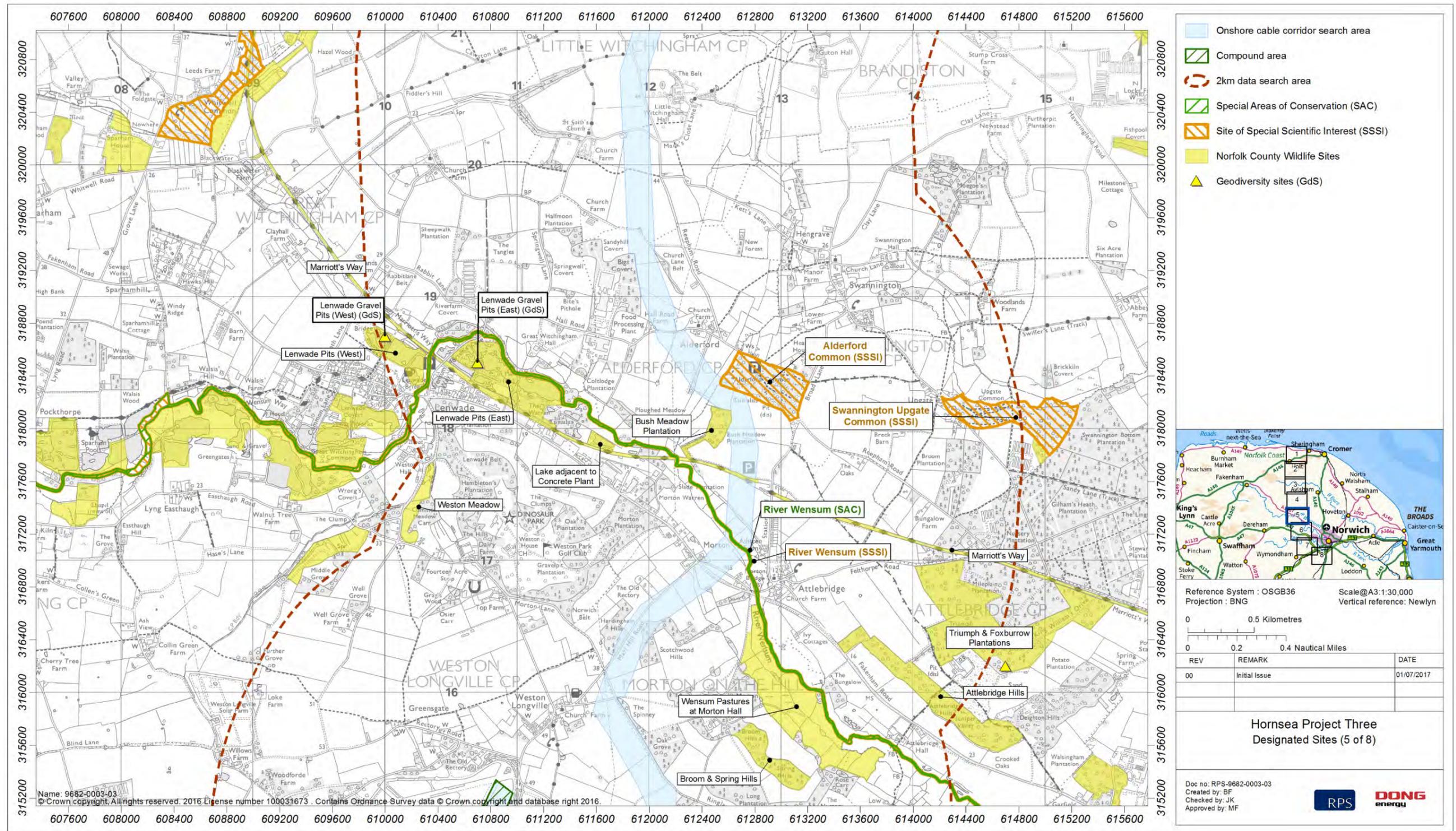


Figure 3.2: Location of designated sites.

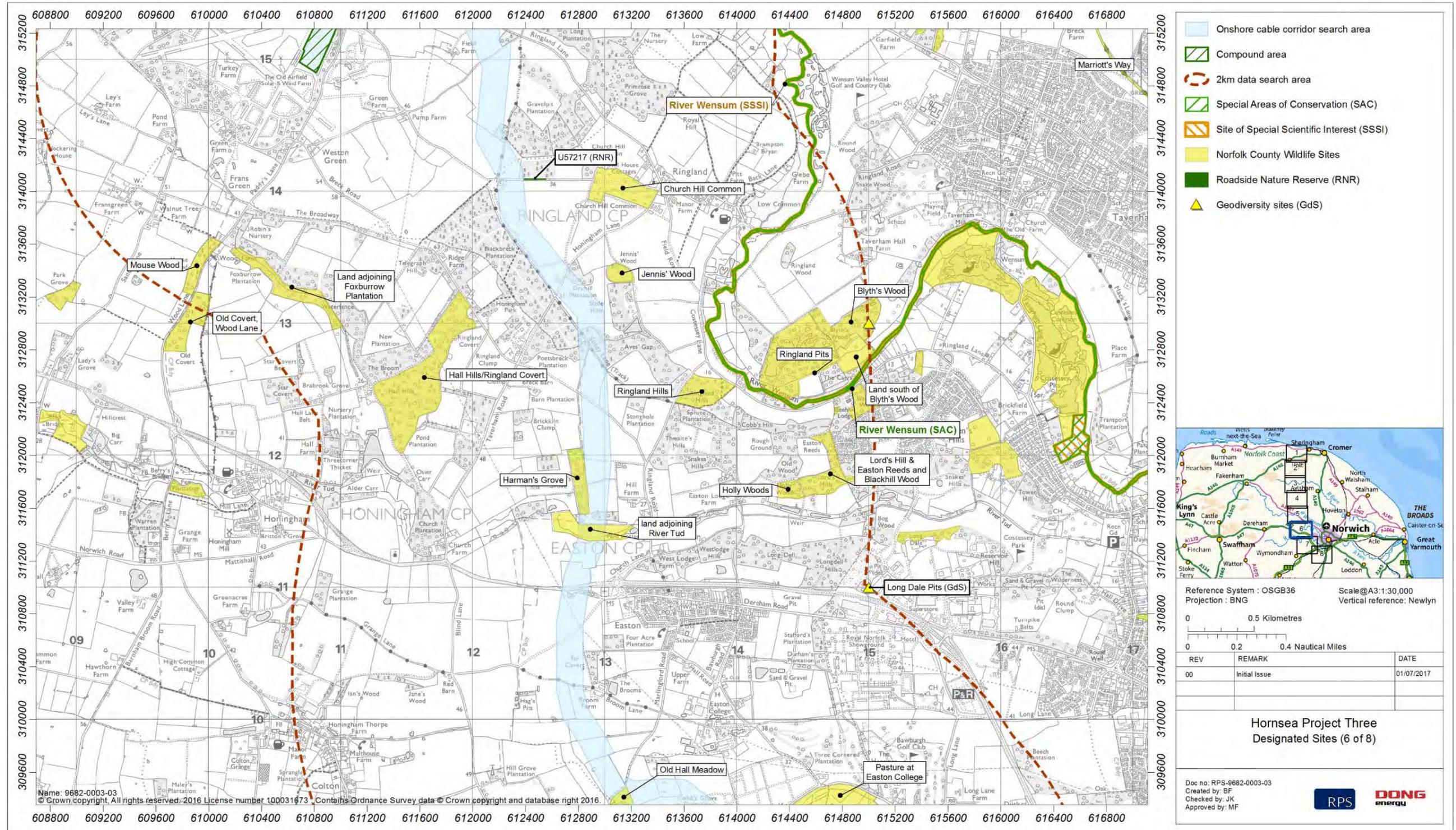


Figure 3.2: Location of designated sites.

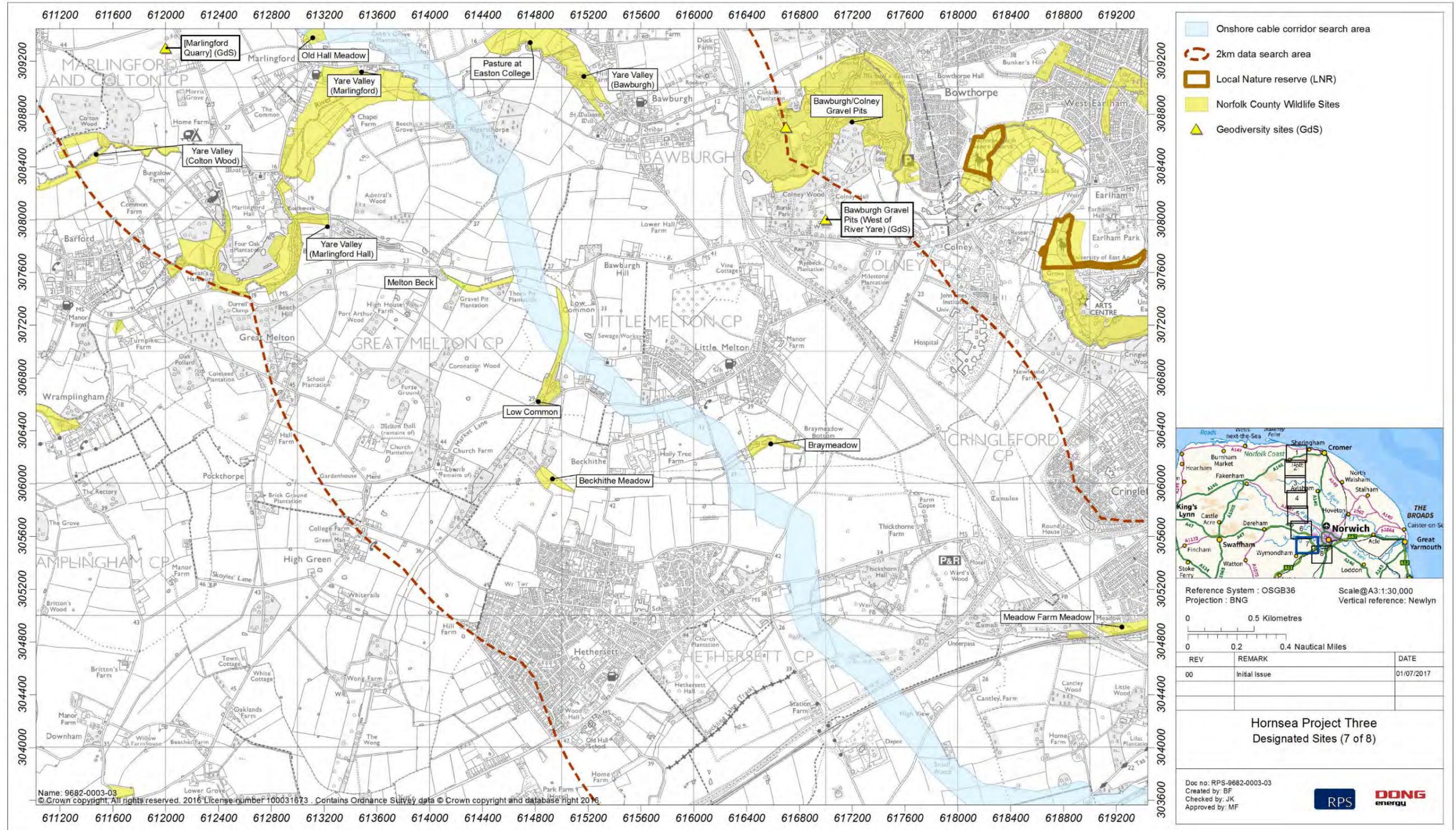


Figure 3.2: Location of designated sites.

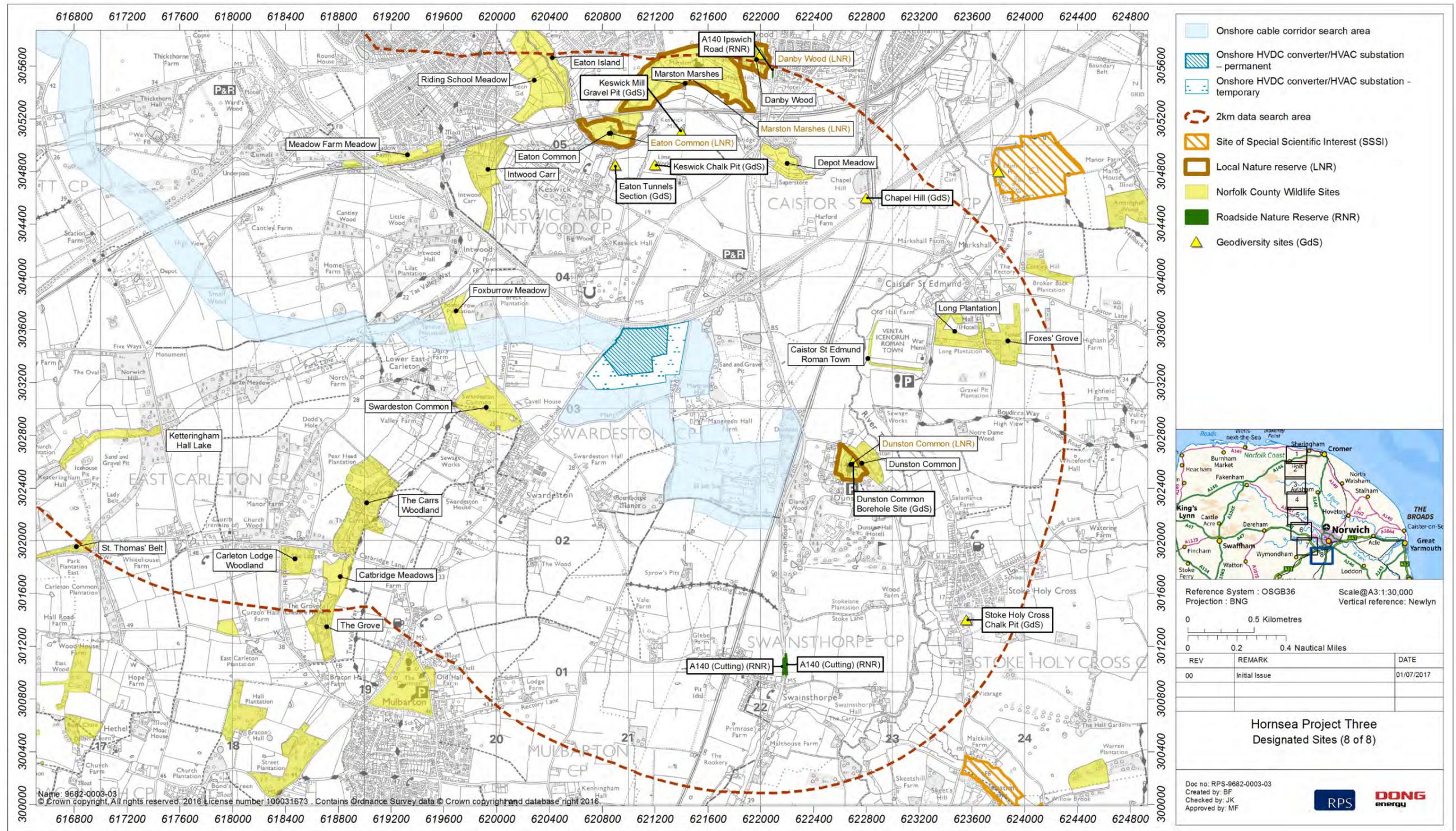


Figure 3.2: Location of designated sites.



Figure 3.3: Phase 1 Habitat Survey.

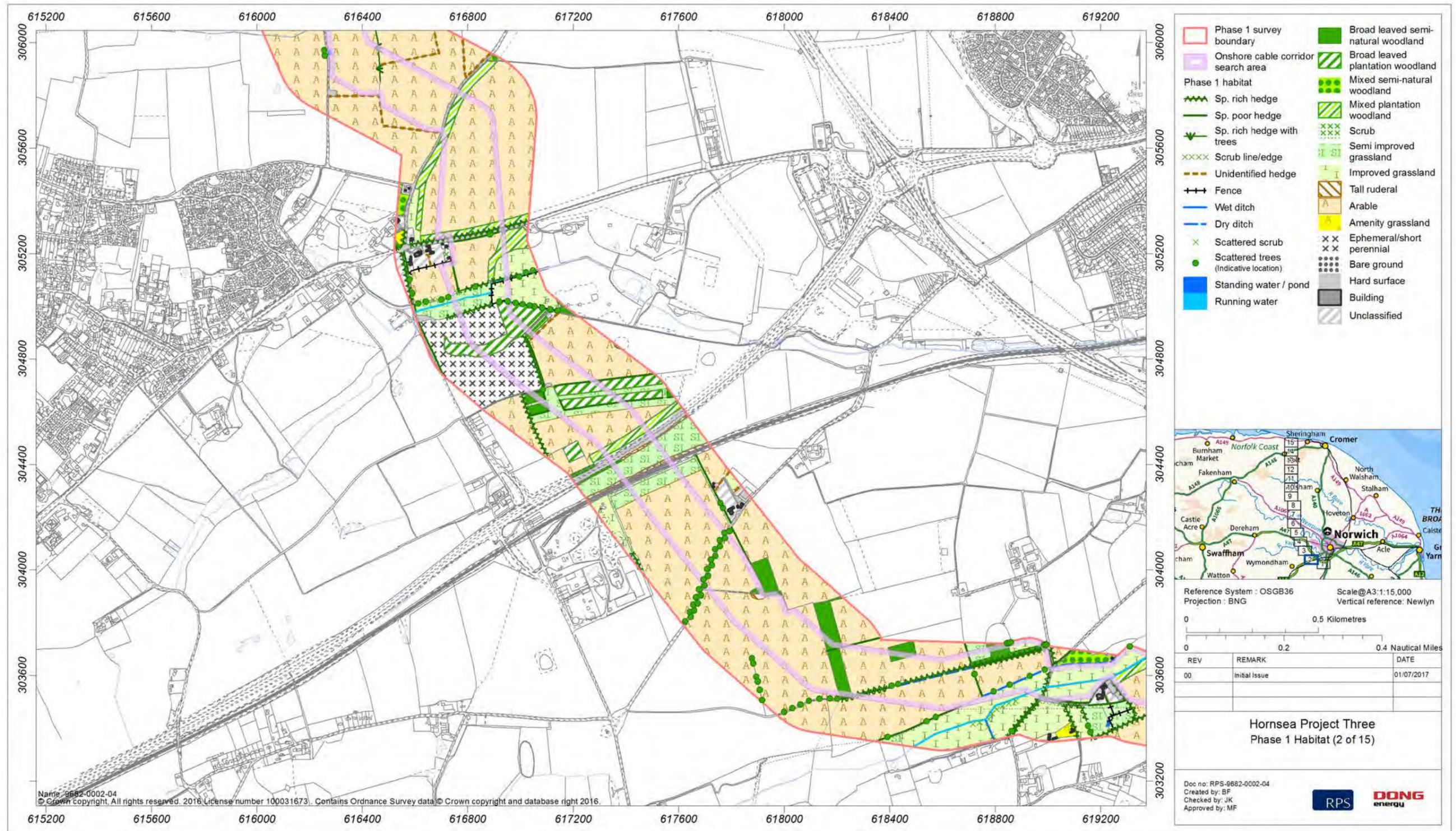


Figure 3.3: Phase 1 Habitat Survey.

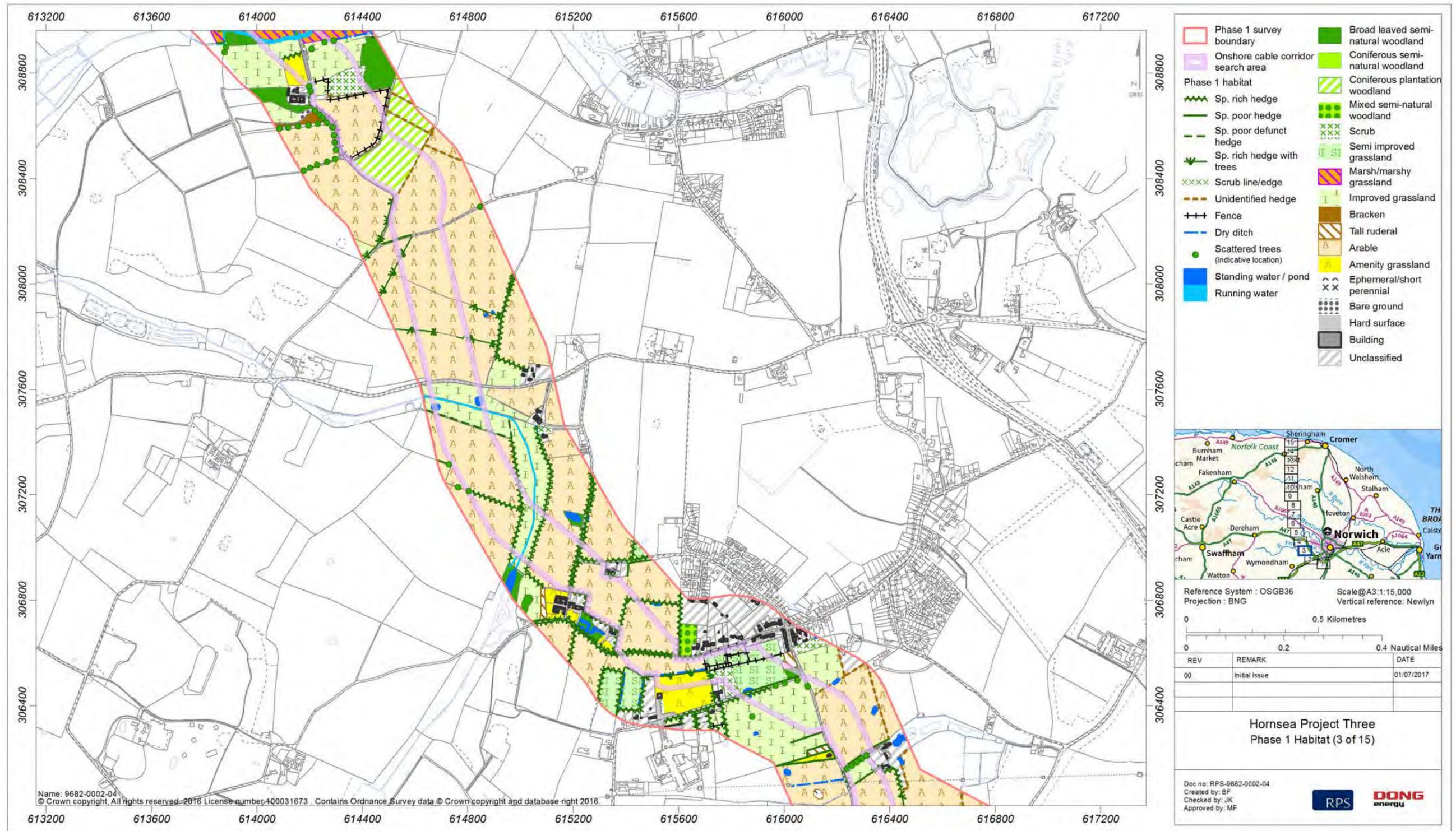


Figure 3.3: Phase 1 Habitat Survey.

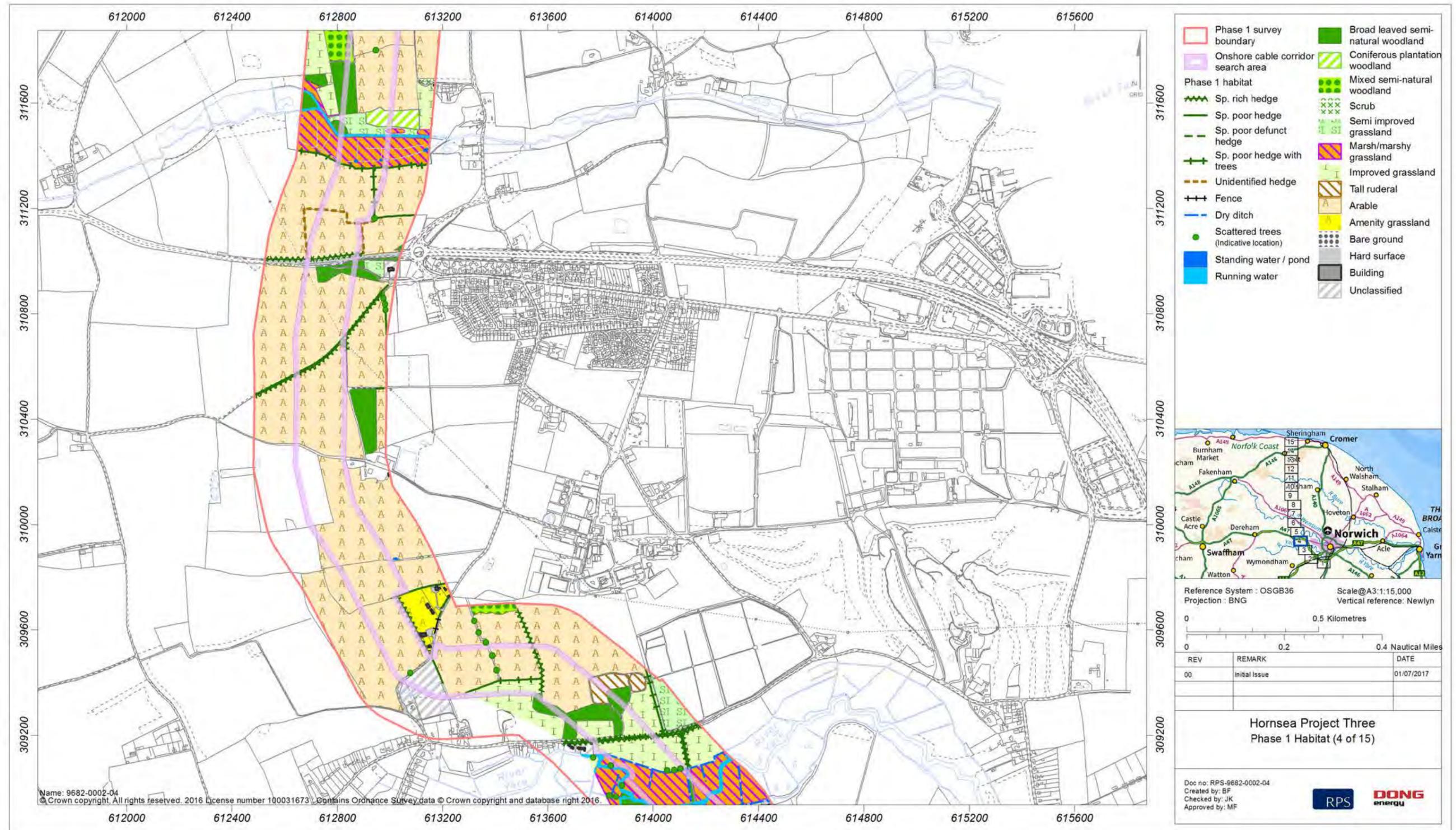


Figure 3.3: Phase 1 Habitat Survey.

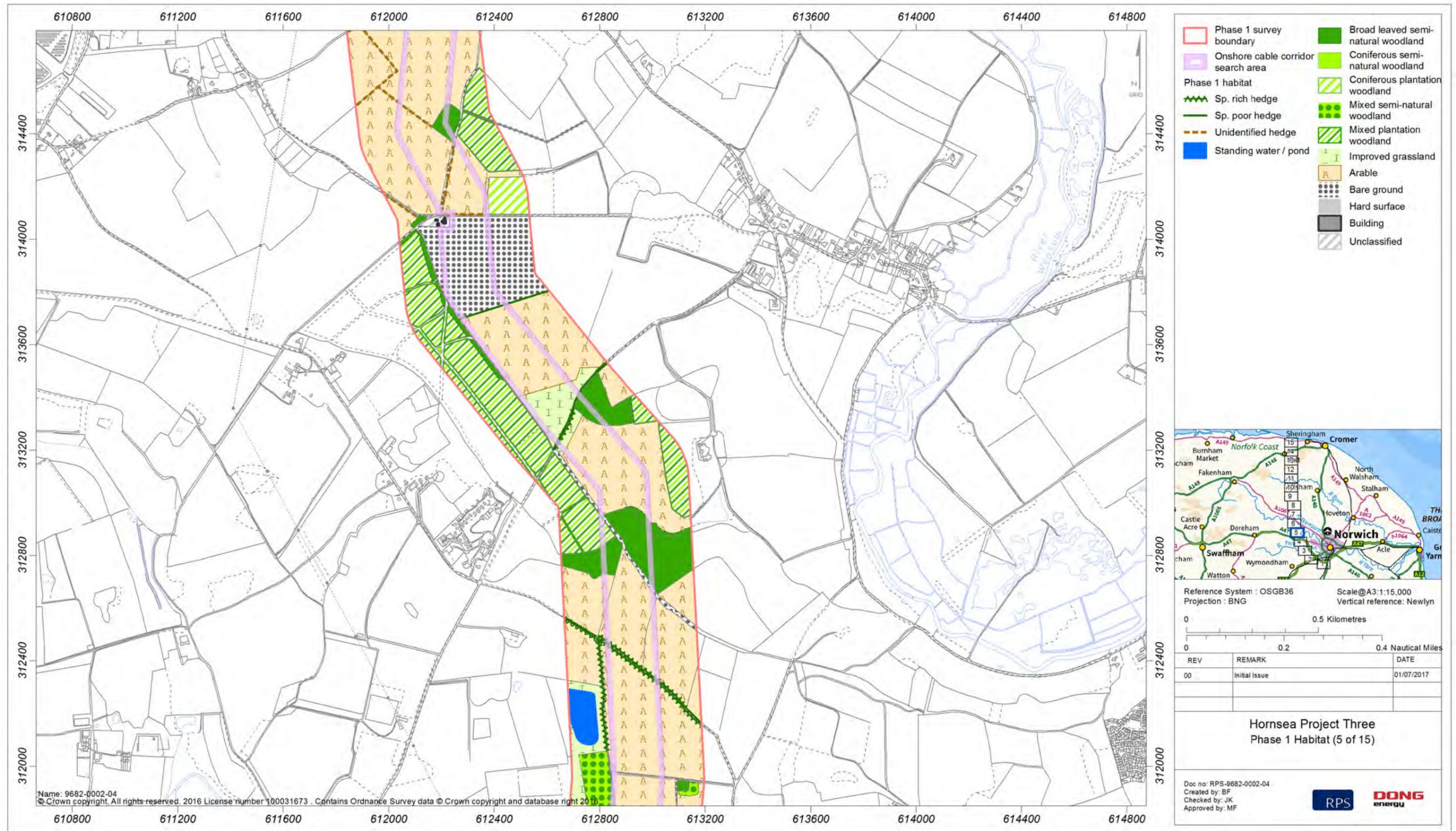


Figure 3.3: Phase 1 Habitat Survey.

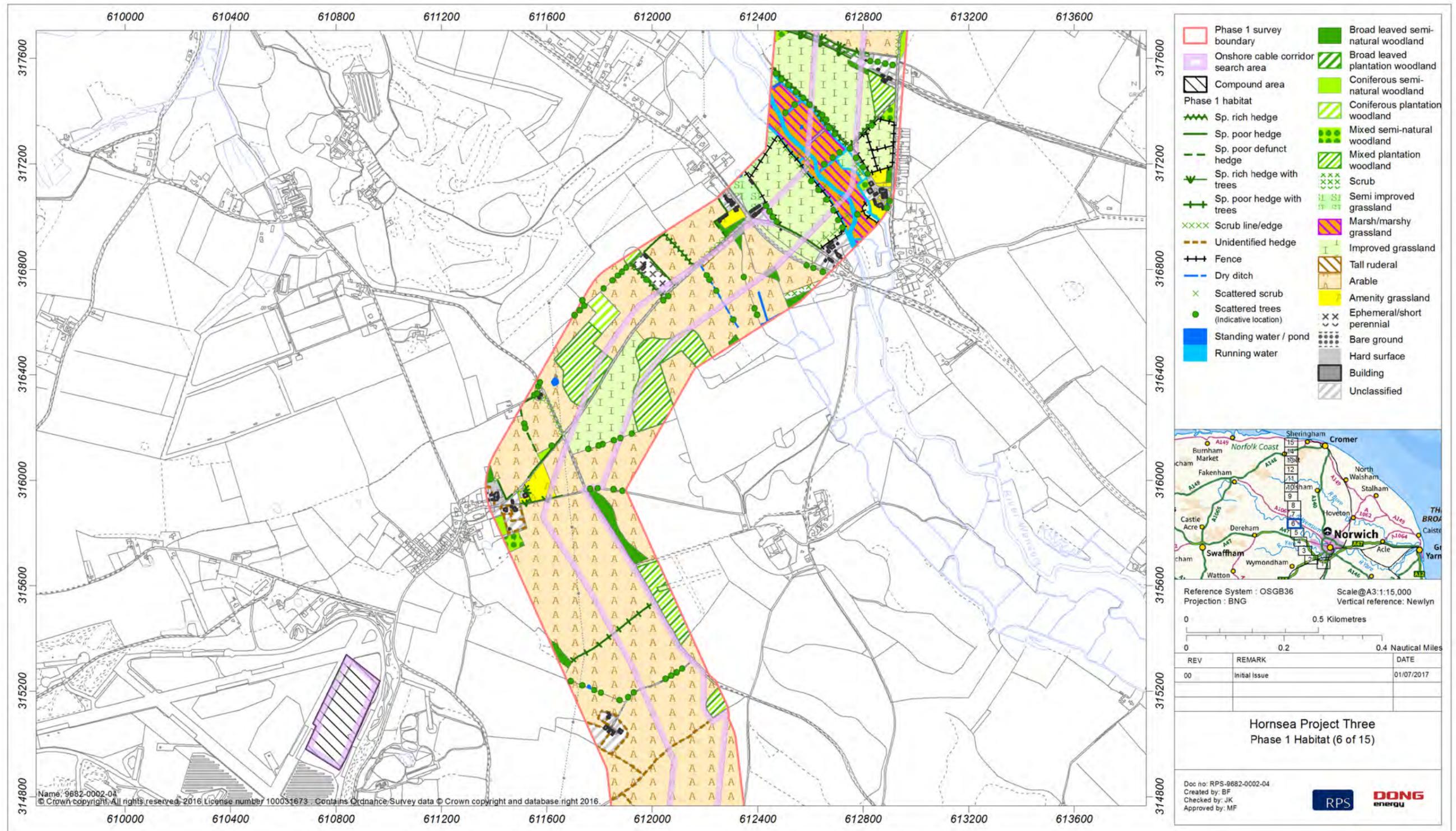


Figure 3.3: Phase 1 Habitat Survey.

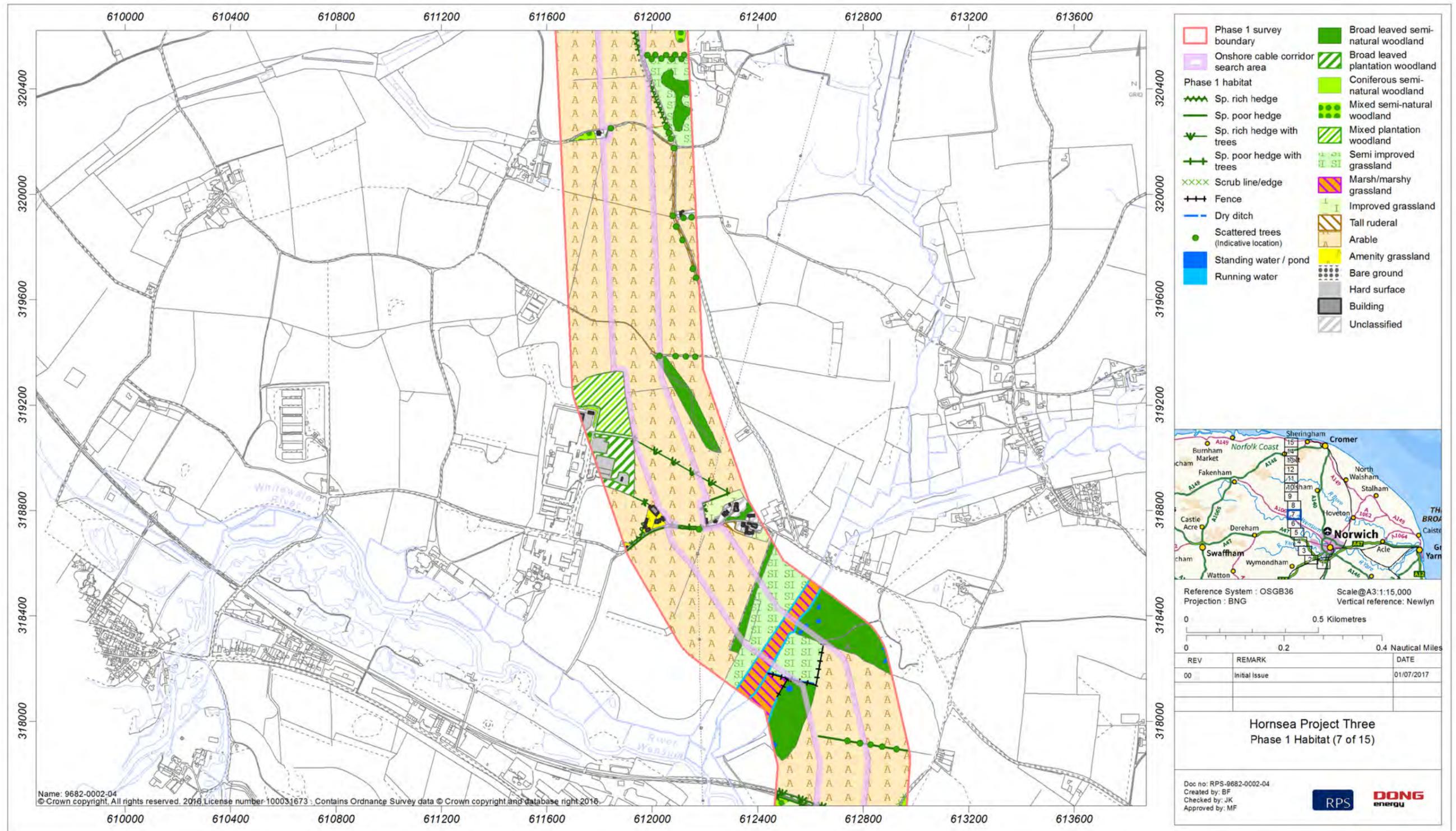


Figure 3.3: Phase 1 Habitat Survey.

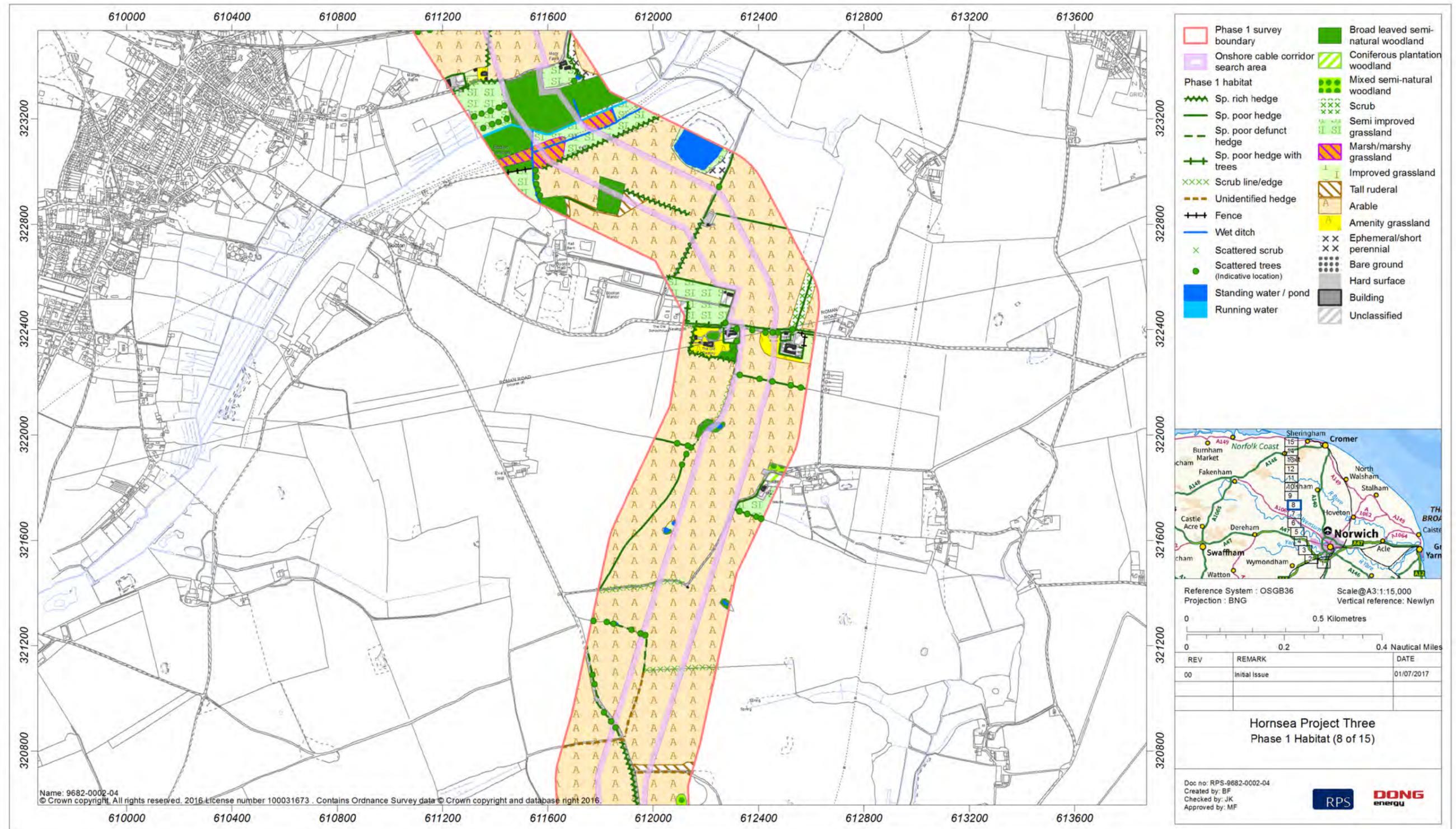


Figure 3.3: Phase 1 Habitat Survey.



Figure 3.3: Phase 1 Habitat Survey.



Figure 3.3: Phase 1 Habitat Survey.

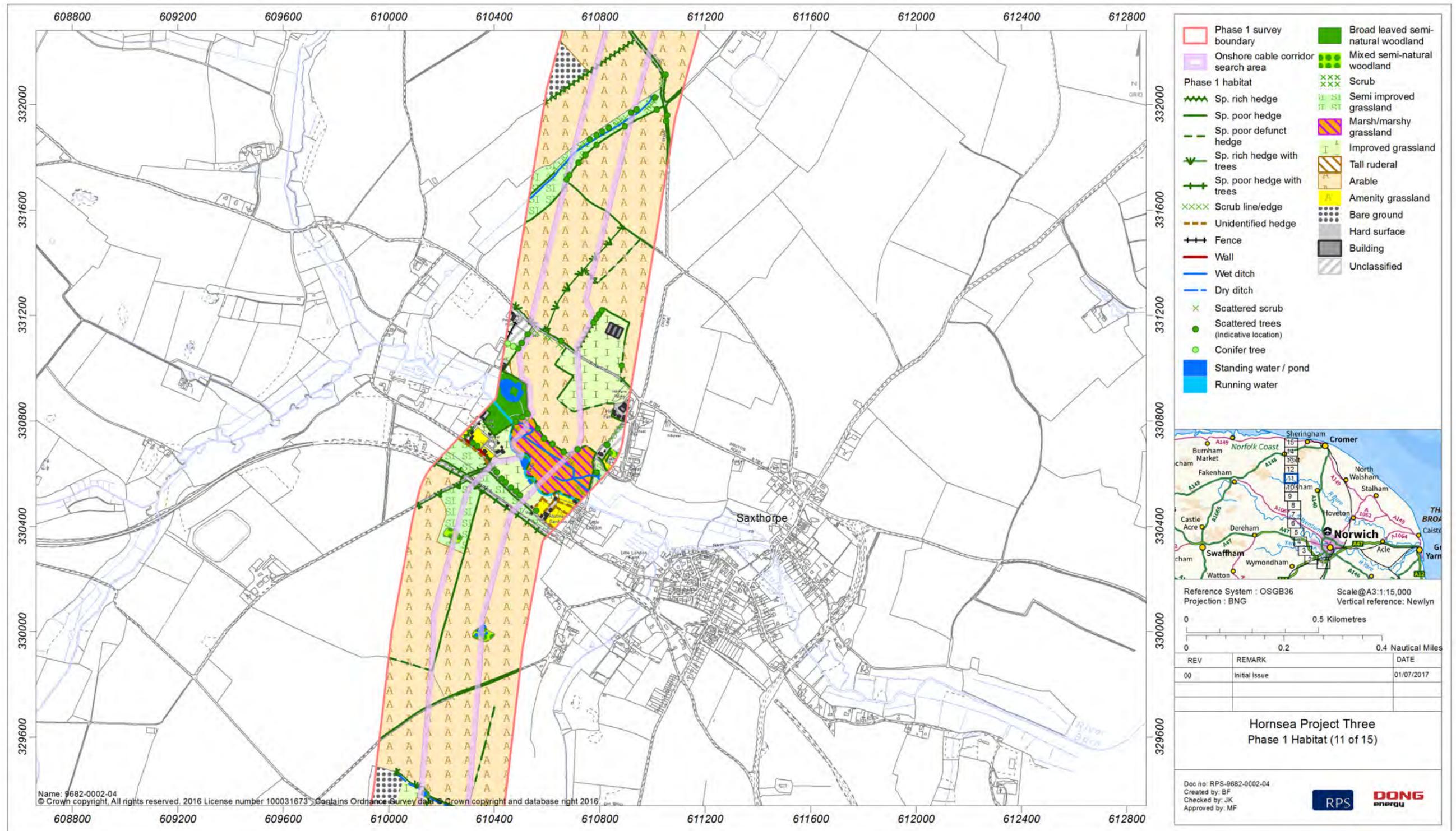


Figure 3.3: Phase 1 Habitat Survey.



Figure 3.3: Phase 1 Habitat Survey.



Figure 3.3: Phase 1 Habitat Survey.

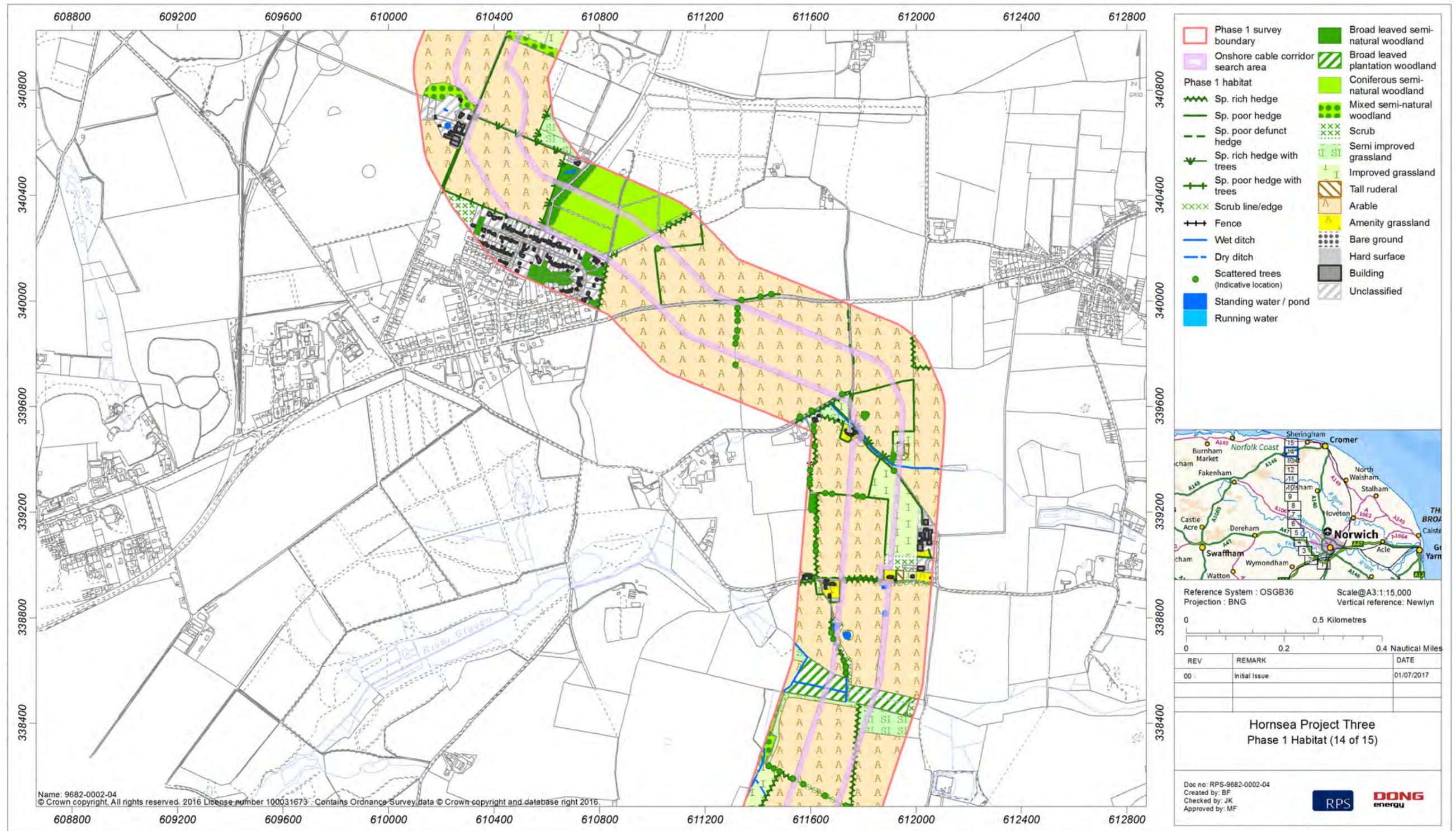


Figure 3.3: Phase 1 Habitat Survey.



Figure 3.3: Phase 1 Habitat Survey.